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MACKENZIE VALLEY PIPELINE INQUIRY

Government
Publications

IN THE MATTER OF APPLICATIONS BY EACH OF

- (a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES, and
- (b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE NORTHWEST TERRITORIES

FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION, OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

November 6, 1975.

PROCEEDINGS AT INQUIRY

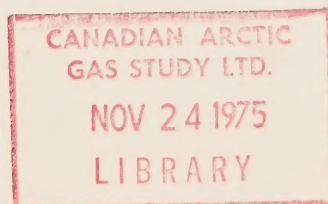
Volume 82

CANADIAN ARCTIC
GAS STUDY LTD.
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Mr. Stephen T. Goudge,
Mr. Alick Ryder and
Mr. Ian Roland for Mackenzie Valley
Pipeline Inquiry;
Mr. Pierre Genest, Q.C.
Mr. Jack Marshall,
Mr. Darryl Carter, and
for Canadian Arctic Gas
Pipeline Limited;
Mr. Reginald Gibbs, Q.C.
Mr. Alan Hollingworth for Foothills Pipelines
Ltd.;
Mr. Russell Anthony,
Prof, Alastair Lucas for Canadian Arctic
Resources Committee;
Mr. Glen W. Bell and
Mr. Gerry Sutton for Northwest Territories
Indian Brotherhood and
Metis Association of the
Northwest Territories;
Mr. John Bayly for Inuit Tapirisat of
Canada and the
committee for Original
Peoples Entitlement;
Mr. Ron Veale and
Mr. Allen Lueck for the council for the
Yukon Indians
Mr. Carson H. Templeton for Environment Protect-
ion Board;
Mr. David Reesor for Northwest Territories
Association of Muni-
cipalities
Mr. Murray Sigler for Northwest Territories
Chamber of Commerce

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WITNESSES FOR CANADIAN ARCTIC GAS PIPELINE LIMITED:

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1 Yellowknife, N.W.T.

2 November 6, 1975.

3 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

4 MR. SCOTT: Mr. Commissioner,
5 as indicated yesterday, in an attempt to update the
6 list of reports emanating from the environmental and
7 social program, that program terminated as far as the
8 matters concerned in this application are concerned in
9 March of 1975, but since then a number of reports have
10 been issued. Heads 1 and 2 list reports that are
11 available in limited quantities either from our office
12 in the first case, or from the Queen's Printer in the
13 second. List 3 is an attempt to prepare a cumulative
14 list up to the present of all reports issued under that
15 program, and a note as to their availability.

16 So we have then filed a complete
17 list of all the reports of that program up to date.

18 MR. MARSHALL: There is one
19 other matter that perhaps should be dealt with before
20 my learned friend continues with his cross-examination.
21 There was a question pertaining to the requirements for
22 borrow. I believe that Gulf would have for its facili-
23 ties. Mr. Hemstock has been able to obtain some
24 information.

25 WITNESS HEMSTOCK: I've been
26 in touch with the people from Gulf and they say that
27 they have a requirement for the Parsons Lake area of
28 between 2 1/2 and 3 million cubic yards of gravel, of
29 borrow. They intend to take it from a source which is
30 south of Parsons Lake and it's -- it would be an upland

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Cross-Exam by Bayly

1 area, and in order to locate it there is a location
2 called Hans Bar and Eskimo Lakes, and west of this
3 is another location called Hans Lake. The proposed
4 gravel source is between those two points. That would
5 be well to the east of the proposed gas pipeline.

6
7 JOHN IVOR CLARK
8 DONALD L. DABBS
9 R.L. HARLAN
10 R.A. HEMSTOCK
11 PETER J. MCCART
12 GRETCHIN V. MINNING
13 GUY LESLIE WILLIAMS, resumed:

14 CROSS-EXAMINATION BY MR. BAYLY (CONTINUED):

15 Q Perhaps before we leave
16 that, Miss Minning, do you have any comment on that
17 particular source? Have you visited it and in your
18 estimation are those quantities available at that source?

19 WITNESS MINNING: I think so,
20 yes. I've not visited that particular site myself.

21 Q Has anyone on your
22 staff visited it?

23 A Yes, I think they have
24 visited that one. That was probably looked at this
25 summer, but I wasn't on that particular part of the
26 program.

27 Q Is it possible to determine
28 without going away and coming back again, how far away
29 from the Parsons Lake facilities proposed by the gas
30 companies this particular borrow site is? Is anyone
31 aware of that, Mr. Hemstock?

WITNESS HEMSTOCK: Yes, we
could get that information. I don't have it.

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Bayly

Q Yes.

A From that description,
and I haven't been able to find a map here with the
exact details, but it's not far from Parsons Lake.

Q Did they say anything
about whether they would require a permanent road, an
all-weather road to go to this borrow site, or was that
not discussed?

A I didn't pursue that with
them. This presumably will all come out in the hear-
ings with regard to the producers.

Q Thank you, Mr. Hemstock.
Dr. Dabbs, if I could ask you a few questions about the
re-vegetation program. We have heard from Mr. Williams
on several occasions, that in most areas the ditch
mound or in the case where a berm is required, will be
made up of as small particled material as possible,
and I assume from that that you are anticipating a
fairly smooth surface where you will be seeding. Am I
correct in that?

WITNESS DABBS: Firstly, it's
Mr. Dabbs, thank you very much.

Q Sorry.

A Secondly, I'm not clear
on your description of the condition here, just what
you're describing for me.

Q Well, after the pipe is
in place, we've been told there will be a ditch mound,
that is the replaced material in the ditch will create a
small mound because the pipe is displaced 12 cubic

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 feet per linear foot, and because most of this work
2 is to be done with the ditching machine, it's antici-
3 pated that this material that is to be put back will
4 be fairly finely cut up, and I'm anticipating that
5 there will be quite a smooth surface to this ditch
6 mound; is that your understanding?

7 A I think perhaps Mr.
8 Williams might correct me if my description here is
9 not quite accurate, but the test site at Sault
10 was constructed using a wheeled ditcher in which the
11 material was excavated, pipe installed, and replaced,
12 and I personally wasn't on staff when the ditch was
13 run in the winter, but I had the material described
14 to me as pieces perhaps the size of your hand coming
15 out of that ditching machine.

16 Q So would it sort of
17 look like the surface of a ploughed field?

18 A When that is put back
19 over the pipe, it's quite irregular, the material is,
20 even though they're small pieces they're not large
21 chunks, the surface is still really quite irregular.
22 As snow melt takes place and spring arrives, the
23 surface material also thaws and settles, and if you
24 recall the first slide that I showed the other day,
25 I'm not aware of any other treatment other than the
26 allowing that material to thaw and settle, and in that
27 particular case it was close to being level. In other
28 test sections there was still quite a pronounced mound
29 over the pipeline which in time that too settles more
30 In some cases, as the ice content was very low, a small

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 mound still remains. So it's not smooth, as you
2 describe, but also not grossly irregular.

3 Q Yes. So that if we can
4 -- can we anticipate then, or are you anticipating
5 that it will in the wintertime after construction and
6 after the pipe has been put in, and when covered with
7 snow, this mound will look smooth but that when the
8 snow melts we will find that it's bumpy, although not
9 in huge chunks?

10 A I think that's fair
11 enough. That's my understanding and anticipated view
12 of this right-of-way.

13 Q You have stated that some
14 of your seeding you'd like to do at the end of winter
15 construction season, just before closing up camp and
16 taking -- closing down the operation.

17 A I think I described it
18 as the last operation following right-of-way cleanup,
19 in other words if a section is completed and cleaned up
20 into January, seeding, the winter seeding would take
21 place just as they're cleaning up, before there is any
22 large accumulation of snow and in fact there may not
23 be any snow on the ground because we would follow
24 so closely behind the cleanup operation.
25
26
27
28
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Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1
2 Q Now, assuming there is
3 snow in some areas, what I am thinking of particularly
4 is the North Slope. On the one hand, we have been
5 told by the snow road builders that even if you take snow
6 from a lake it won't increase the thickness of the ice
7 appreciably because the wind will blow the snow right
8 back on again.

9 And, I am assuming that
10 if it will do it on the lakes, it will very likely do
11 it on the right-of-way as well. It is the same wind
12 after all. What I am concerned with and perhaps you
13 could comment on that is that if you seed on top of
14 the snow is it not possible that some of your seed is
15 going to be lost on the right-of-way because it is
16 going to blow off.

17 A If for one reason or
18 another, the seeding operation was delayed a few days
19 from the backfilling, I think that is reasonable to
20 expect that there will be loss of some seed. Surely
21 there will be loss of some seed even if it was con-
22 fined to a spring helicopter seeding. That is one rea-
23 son, in fact, that the rates of application appear
24 rather high to anyone accustomed to seeding grasses
25 in the southern areas because that is a compensation
26 for some of that loss which we anticipate. However,
27 if the winter seeding does follow immediately behind
28 the backfilling operation, there shouldn't be so
29 much snow to eliminate the success of the program.

30 Q Well, if the only

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McCart, Minning, Williams
Cross-Exam by Bayly

1 person in the whole organization to please was you, Mr.
2 Dabbs, when would you prefer to seed?

3
4 A I think just as we now
5 describe it is largely a winter operation with a spring
6 dressing and a spring surveillance and obviously there
7 will be ground work in the spring so there will be a
8 return. We have proposed this at this stage in the
9 program and the project on the basis of our experience
10 of some winter seeding. Going back to the first day
11 I joined the project, I thought that would be a
12 reasonable time to seed but I had no evidence to show
13 that it would in fact work until we, a year ago this
14 winter, seeded plots in the Tuk area following some
15 winter operations. This confirmed my feeling that it
16 could, in fact, work.

17 So to answer your
18 question, I think our current plan satisfies me completely.

19 Q All right. So the only
20 thing then that hasn't been tested in winter seeding
21 is seeding where the tundra mat has been stripped off
22 and replaced and then the seeding has been done. And
23 that's what you are planning to test out.

24 A No, in fact, the program
25 I allude to of a year ago was a limited tundra strip-
26 ping project near Tuk and this seed was applied to
27 that stripped area so we have a combination of both
28 events.

29 Q Now, you referred to
30 dressing in the springtime. Is that a re-seeding or

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 is that a fertilizer application?

2 A It could be both. And
3 I think it would be one of not a complete re-seeding
4 of the entire pipeline but only in those areas where
5 we could observe as the snow melted that there was
6 perhaps a washing away of seed or fertilizer or
7 areas that we would anticipate this taking place.

8 Q Now, spring is a relative
9 term. Can you give us an idea what month, for example,
10 you would anticipate doing this dressing operation on
11 the North Slope?
12

13 A I think I discussed it
14 briefly yesterday where seeding to date in that area
15 has not been able to start before about the twentieth
16 of June, on the North Slope. Perhaps spring comes
17 earlier than that. There are other considerations as
18 we discussed--the potential conflict with calving
19 caribou. So I think the period we are talking about
20 on the North Slope is perhaps June 20 to the end of
21 the first week in July.

22 Q So you would be governed
23 by the calving of the caribou and somebody would be
24 monitoring that to tell you whether you could go in
25 one week or another week or whatever in order to do
26 this dressing operation?

27 A Yes. I believe so. That
28 has been the stated policy that the caribou movements
29 and distribution would of course be monitored and
30 this information would come to us. Of course, the

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1
2 caribour do not simultaneously calve across the entire
3 North Slope so I anticipate there will be major areas
4 that we could get to earlier if the thaw had
5 arrived earlier.

6 Q In some areas, would you
7 contemplate the necessity of having to seed or do
8 this dressing operation from the ground?

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Cross-Exam by Bayly

A I think that is feasible only on a limited areas, areas that we would identify as highly, areas of high erosion potential where we would be going out to stake down mats to prevent erosion. In those cases if they are a non-seeded mat, such as a jute mat or a wood excelsior mats, then they would be probably hand seeded and then the matting laid, but it certainly wouldn't be a technique to be used over a large area.

Q Mr. Dabbs, I invite you to agree with me when I say that the north slope is a very busy place in the spring, not only for cariboo but for geese and ducks and shore birds etc. Has that been your experience or the knowledge that has been reported to you?

A I have been on the north slope of the Yukon several springs and it is busy for everything except the geese. They are not there generally there in any abundance, of course the snow geese are nesting on Banks Island and don't arrive on the coast until late in the summer.

Q So it is an area in which a lot more is going on than the cariboo calving?

A Yes sir.

Q And would you anticipate problems in your scheduling which might involve conflicts with some of the other species that use the north slope in order to nest and rear young.

A We have discussed this with our ornithological consultants, L.C.L. Ltd. and we have the studies for Arctic Gas on the north slope, well in the

Clark, Dabbs, Harlan, Hemstock,
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entire route, discussed the potential conflict of a seeding operation with birds and I suppose any time of year does present some disturbance. One or two passes with a helicopter or a small fixed wing aircraft have not shown to be detrimental unless there is some concentration of birds, such as a shore line area around a lake. They have agreed that the most acceptable time to them is the period of time that I have also identified here. The point I think is important in referring to the birds, birds such as Lapland Longspur who nests throughout the tundra and most activity as you mention takes place along the shorelines of the small lakes or along the shorelines of creeks and rivers and for the most part the pipeline route does stay a distance away from these lakes and that in itself I think is important to remember when you are discussing the possible disturbance to birds.

Q Well on the subject of disturbance, my understanding is that it is not so important that you scare the birds but that you scare them off nests and they may loose their eggs or some of them to predators at the time that the disturbance is caused. It may not be something that you can actually observe from the air. You may have to do things like egg counts in order to see what the impact has been. Is that the information that you have?

A Yes that is quite right. In fact my duties have in the past included the co-ordination of wildlife work for Williams Brothers and I

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was very much involved with the planning atleast of many of the disturbance studies which have been reported in the Biological Report series. I think one which is of importance to our discussion here would be the aircraft disturbance studies that were, that took place associated with the camp that we had near the Firth River in 1972 and disturbance studies on the spits, that same year, and the results of that have guided us in our thoughts and plans towards this seeding activity.

Q Now you in your answers to Mr. Hollingworth I believe it was, said that you would have to fly low but we did not get the altitude that you would anticipate flying for both seeding and fertilizing.

A I think the one photograph I showed had that as an intent to give you some idea of the height above ground.

Q If I guessed a hundred feet would I be far off?

A That is the, the aircraft itself is about that height and of course then with the bucket on it below it is --

Q At that height what does the prop wash do to the seed?

A What it does is it lays the seed fertilizer on a nice uniform spread on the ground better than you can possibly do by hand.

Q It is a mechanical broadcaster is it?

Clark, Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Bayly

A Yes the prop wash if you wish from the helicopter is an excellent means of spreading the seed nice and evenly.

Q You don't find that the edges that it shoots it out beyond the right of way...

A It doesn't shoot it out and it is not a perfectly even dispersal and directly underneath the aircraft or the bucket is where the greatest concentration is and it does grade out from the edge but of course that is precisely what you would want since they fly directly over the backfill mound and that the seed would diminish in density towards the outer edges of the right-of-way.

Q Now how close to the banks of rivers and lakes do you plan to do your seeding and fertilizing by helicopter?

A The helicopter operation, our experience that we have gained in seeding, would lead us to conclude that we can carry that seeding operation very close to the banks of streams and rivers because there is a control inside the machine that you can cut seed off and start it again immediately and I would say we could carry it up to within ten feet of the bank of a river without dumping, if you wish, undue amounts of seed or fertilizer into a stream.

Q And have you checked with the people like Dr. McCart to find out what undue amounts of seed and fertilizer would be in water courses?

A We have discussed ^{this} and perhaps

Clark, Dabbs, Harlan, Hemstock,
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Cross-Exam by Bayly

I maybe even over-stated it because the rate of application on a single pass on a right-of-way is really not a significant amount of seed or fertilizer to be dumped into a stream or river at the time that we will be there because of course that is during the spring runoff.

Q What sort of fertilizers would you be using?

A It is stated in appendix C to the testimony that fertilizer or nitrogen phosphorous pottasium at a ratio of one to two to one at a, of a fifty pounds per acre nitrogen or fifty-six kilograms per hectare as it appears in the appendix.

Q All right. Perhaps Dr. McCart could tell us what effect this kind of fertilizer might have on not just fish but other living creatures in the waters, either inadvertently it got seeded over or in a more flaring problem if the supply depot somehow managed to allow some of this fertilizer to escape into a watercourse.

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Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 WITNESS MCCART: At the rate
2 of application that they've planned it wouldn't have
3 any real effect, I think, on a single pass alongshore
4 of a lake or into a stream. 50 pounds of nitrogen,
5 there are people in my area putting that on their
6 crops. We have in fact recommended that care be taken
7 that supply depots be constructed or placed so that if a
8 dump occurs, it cannot get into natural bodies of water.
9 If, however, through some accident it did, you might
10 expect that locally, very locally it would be toxic
11 but that as it dispersed you would have an increase on
12 the productivity of the water, for instance, a lake
13 would become more eutrophic or more productive for a
14 short period of time, measured at the very most in a
15 matter of a few years, probably a shorter period of
16 time than that. Nitrogen is very mobile, moves
17 quickly out of systems, and phosphorous tends to be
18 locked up in the bottom sediments within a matter of
19 years.

20 Q So it could be a problem
21 only if -- an appreciable problem only if allowed to
22 spill or escape into a watercourse.

23 A That's right. Of course
24 this stuff is granular and it's not the sort of thing
25 where you've got a liquid which might disperse rapidly
26 through water. So I don't really see it as much of a
27 problem.

28 Q You would recommend,
29 where possible
30 though, that it be stored away from bodies of water?

A You wouldn't want water

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 seeping through your storage area or something of this
2 sort where it would be difficult to handle wet ferti-
3 lizer.

4 Q Now, you'll be seeding
5 in the spring and from the photographs you showed us
6 that were taken, I believe, in August, there should
7 be a nice bright green crop by the end of the season,
8 is that correct?

9 WITNESS DABBS: That's the
10 way we expect. I think it's important perhaps at this
11 juncture in the discussion to point out, however,
12 we're also realists and there can possibly be climatic
13 events in any one season which would result in a de-
14 crease in the success of a re-vegetation program, which
15 requires the surveillance and monitoring program which
16 is proposed to detect these areas of failure, or at
17 least lack of success in order that additional ground
18 work or seeding may take place.

19 Q The photograph you showed
20 showed the seeded area as a brighter green than the
21 area surrounding it with the natural species. Was that
22 because the natural species got an earlier start and
23 they've come closer to maturity at the time the picture
24 was taken than your re-seeded crop?

25 A That might be part of
26 it but I think it's mostly due to the nature of the
27 grasses that are being seeded, and the fact that they
28 have been promoted in their growth through the use of
29 fertilizer.

30 Q All right now, if you were

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 a goose on the North Slope, which would you prefer?
2 Would you prefer the stuff that you had seeded, or
3 the natural species?

4 A I have a difficult time
5 putting myself in the place of a goose, but I suspect
6 I would prefer the high protein grasses on the right-
7 of-way.

8 Q And have you seen that
9 as a problem that staging geese may invade your crop
10 as they do in your own home province, and make it
11 necessary to re-seed the next year?

12 A We haven't yet seen it
13 in any of the 21 rig sites that have been seeded
14 throughout the general Mackenzie Delta area, at least
15 it hasn't been reported to me. But I would anticipate
16 that this could result in at least some followup seed-
17 ing, certainly close surveillance of it, because they
18 will only crop it to ground level and that doesn't
19 destroy the root system, and at the time they would be
20 cropping is late in the summer, and that has given the
21 plant time to establish. As I mentioned before, we
22 have seen the results of caribou grazing on these plots
23 and trimming them to ground level, and a complete and
24 rapid recovery the next year.

25 Q All right, so you don't,
26 unless something happens on one of your rig sites, and
27 I'm assuming from that that you have rig sites that
28 are re-seeded in staging areas, is that the case?

29 A Yes, some of them are.

30 Q Because the staging area
31 is the important one, as I understand, it's the one

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 where the geese are getting fueled up for their flight
2 south.

3 A Yes.

4 Q Are there weather
5 conditions, apart from conditions that make it impos-
6 sible to fly, but within the range of flying conditions
7 that you would not be able to seed in?

8 A Very high winds. Of course,
9 it's an aerial broadcast application and in strong
10 cross-winds that result in such severe drift as to make
11 the operation worthless.

12 Q So you might have problems
13 in areas like the North Slope that often have fairly
14 strong winds?

15 A I think we encountered
16 just those types of problems the very first spring three
17 years ago when we went up for our first helicopter
18 seeding on some sites for Gulf and Shell Oil, and of
19 course, on the 20th of June we simply waited and seeded
20 at about three o'clock in the morning when the winds
21 were down and the sun was still up.

22 Q So you found that there
23 were enough times that you could make a dash out in
24 still times and do your seeding.

25 A Yes, I expect that there
26 will be time within that time frame to do the seeding.

27 Q So you haven't felt as a
28 result the need for some contingency plan for seeding
29 in another way in order to ensure that you don't miss
30 a season?

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Bayly

1 A Well, if for some
2 strange but possible reason we had three weeks of
3 continuous fog or high winds, the only areas that
4 might be seeded are those that would be identified
5 as high erosion potential. Those would be dealt with
6 first, and those would be dealt with on the ground,
7 and those are certainly the areas that must receive the
8 first attention so I am sure that the critical areas
9 for seeding could be reached and could be treated that
10 spring, and the rest of it could be seeded either in
11 the fall of that year or the following spring.

12 Q What would happen, Mr.
13 Dabbs, if you didn't re-seed? In your opinion would the
14 native plant species come back across the ditch mound?

15 A Oh, I think that's been
16 shown to be the case, by quite a number of authors:
17 Strang, Fernandez, to name just two, and their examina-
18 tion of seismic lines and other disturbances. Lambert's
19 work in the Canoe Lake area showing a re-invasion of
20 natural disturbances. Zoltai reported this
21 in his reports as well. A fundamental law of nature
22 is that it simply won't leave a void and the disturbance
23 will be re-colonized in time. Our only concern here is
24 the time it takes for nature to recover and to mend it-
25 self, and that's the purpose for enacting a re-vegetation
26 program as soon as it's possible, to reduce that time
27 period.

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O All right. And you reduced that time period partly for aesthetics but partly for the security of the right-of-way so that erosion problems are stopped or retarded and so that the active layer is returned as much as possible to its original depth.

A It is one of a security of the line and the obvious environmental Protection which results from the control of erosion, yes.

MR.BAYLY: Yes. Those are all the questions I have for this panel at this time, Mr. Commissioner.

MR.VEALE: Mr. Commissioner, before entering cross-examination, there are two matters that I would like to deal with. I understand that you had asked counsel a couple weeks ago whether they wished to bring further evidence relating to the Fairbanks Corridor and I have received instructions from my clients, the Council for Yukon Indians, and they have indicated that they would not be presenting any further evidence at formal hearings relating to the Fairbanks Corridor. It is our understanding, however, that the Inquiry will be returning to Whitehorse for a community hearing sometime in 1976, I presume. Perhaps, you could advise us whether this is the case.

THE COMMISSIONER: Well, there are no plans currently to do that.

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1
2 MR. VEALE: There is a
3 rumour certainly in Whitehorse that, Mr. Commissioner,
4 that you will be returning and that you had in fact
5 said so at the inquiry.

6 THE COMMISSIONER: No, I didn't
7 say so but I said that if it appeared necessary to
8 consider the Fairbanks Route to give it further
9 consideration. I said if it were necessary to give it
10 further consideration, if it were necessary to treat
11 it rather more seriously than anyone had thought we
12 should before we went to Whitehorse, then we would
13 have to think about returning. I think you will see
14 that I said that when we left Whitehorse. And I
15 raised the matter two weeks ago here so that counsel
16 for all the participants and the two pipeline companies
17 could tell me what they thought about it all. So,
18 see one of the difficulties is that the pipeline
19 guidelines aren't altogether clear about how far this
20 whole question should be pursued and I indicated
21 two weeks ago that we had pursued it about as far as
22 I thought that we could. And I wanted counsel to tell
23 me what they thought should be done about it. Should
24 we go any farther or should we simply leave it to
25 counsel later on to sum up the whole case on the basis
26 of the evidence we have already heard. I think that's
27 where we're at.

28 MR. VEALE: Mr. Commissioner,
29 then, perhaps I'll reserve my comments then until I
30 have further instructions from my clients because

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1
2 they had understood that the Commission would be
3 returning to Whitehorse.

4 The second area that I
5 would like to deal with that I was discussing the
6 matter of the Miller Report, I believe, on Ross River
7 which Mr. Scott has advised that he now has in his
8 possession and has read. We have asked for the
9 production of that report because it would assist us
10 a great deal in presenting evidence in phase four of
11 Inquiry. Mr. Scott, I gather has reservations about
12 making the report public and we do not, in fact, insist
13 that if there are problems in that regard, we do not insist
14 on having it made public. However, we would like to
15 have it produced under certain restrictions in order
16 that some of our witnesses would be able to use it in
17 preparation of their evidence.

18 MR. SCOTT: Mr. Commissioner,
19 the problem with this report which is a report entitled
20 "The Economic Acculturation of an Indian Band" by
21 George W. Miller and another report that Mr. Bayly
22 has requested on--I forget the title of it--but it is
23 on the subject of reindeer herding in the, on the
24 Arctic Coast by Dr. Stager is that they were both
25 commissioned by the department for in-department
26 purposes. They are both studies done on a confidential
27 basis of relatively small communities. The Ross River
28 one deals with the effects of a kind of development on
29 that community and the reindeer ^{herding} one deals with the
30 abilities and capacities of persons in a given

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1 community to effectively herd reindeer. The trouble
2 with both of them is that they are written in such
3 a way that it is virtually impossible to preserve the
4 animity of persons in those communities about whom
5 comments are made. Now, I don't think there is any
6 legal privilege that attaches to either of these reports,
7 though I would not like to speak for the department of
8 this issue. Presumably if they insist, their own
9 lawyers should come forward and resist the production
10 of the report. And I would I have no objection to
11 releasing this report to counsel but because of the
12 comments that are made in each of the reports,
13 about individuals who can be identified, I think, if
14 the report got into the hands of the community in
15 question. I have grave reservations about whether they
16 should be released as they are. To begin with, the
17 author would be exposed to--if the words are untrue--
18 might be exposed to actions in the court for libelous
19 or slander. I am not suggesting that there is anything
20 in any of these but the nature of them an
21 anthropological work dealing with living people in a
22 living place calls for conclusions about people and
23 their motives. I frankly don't think that without
24 a specific notice to the department and to the authors
25 of the reports that they should be released unless it
26 is simply to counsel. Now, if Mr. Veale is prepared
27 to review the report himself with that in mind, I have
28 no objection but if he wants it to be a public
29 document and I think to circulate it among his clients
30

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1 makes it impossible to regard it as anything other
2 than a public document. I will have to resist and
3 simply ask leave to notify the department that he is
4 going to make a formal request that it be produced.
5

6 THE COMMISSIONER: I have a
7 couple of suggestions--three suggestions. One is that
8 counsel might consider whether these reports can be
9 given out with Mr. Scott given liberty rephrase the
10 passages that it might be thought that it should not
11 be made public. It is one possibility.

12 A: second possibility
13 would be that you gentlemen might want to leave it
14 to Mr. Scott and his staff to simply provide you with
15 summaries of what these say.

16 The third question that
17 I--it's really none of my business but if Mr. Scott
18 is going to let you, that is, Mr. Bayly and Mr. Veale
19 see these on the understanding that the people you
20 represent do not see them, you might--no doubt, you
21 have thought about it but you might think twice about
22 the position that leaves you in.

23 Then, finally, the fourth
24 possibility is that you want to pursue this and Mr.
25 Scott can advise the department and presumably they
26 will raise a claim of privilege that we can then
27 consider.

28 MR. SCOTT: Mr. Commissioner,
29 might I make my observation, suggestion one, that the
30 document be rephrased. I don't think that that in either

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1 case is possible. Indeed, it has been attempted but
2 the ability to rephrase it depends very much on the
3 size of the community and in each case, it really is
4 not possible to do that without destroying the heart
5 of the report. Or I found it impossible. Indeed, Mr.
6 Miller was asked to do it with respect to his report
7 and he found it impossible so I think suggestion one
8 even if assuming that we can take it on is not some-
9 that is likely to be helpful.
10

11 With respect to suggestion
12 three, that Mr. Bayly and Mr. Veale ^{may} have some reser-
13 vations about seeing a document that they can't tell
14 their clients about. I quite understand. It may be,
15 however, that they would be prepared to look at these
16 documents to determine whether in their judgment, they
17 are sufficiently important to require them to pursue
18 step number 4 because as I understand it, step number
19 4, it will be necessary to notify, not only the
20 Department, but the authors. There is no or only
21 qualified privilege attaching to anything that is
22 said or produced at an Inquiry of this sort. It is
23 not an occasion of absolute privilege and--

24 THE COMMISSIONER: There is
25 qualified privilege here, I think.

26 MR. SCOTT: I think qualified
27 privilege. There is the privy counsel case that I
28 think provides us with no more than that. But it might
29 be that my friends would be happy to see these reports
30 to decide whether they want to carry the matter further

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2 and if they are prepared to do that, I will be glad
3 to show them to them.
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1 MR. VEALE: Mr. Bayly has some
2 further information.

3 MR. BAYLY: With regard to the
4 report that I asked Mr. Scott for, I have received his
5 reply which, in substance, was what he has said in
6 public here, and because of that we found it more
7 expedient to obtain the report without his assistance,
8 and have done so.

9 MR. SCOTT: Well, I'm glad
10 to hear that. If my friend can get it some other way,
11 that certainly removes me and perhaps the author from
12 the dilemma. May I encourage Mr. Veale in that way?

13 MR. VEALE: I haven't had the
14 same success, unfortunately.

15 THE COMMISSIONER: See Mr.
16 Anthony.

17 MR. VEALE: Mr. Commissioner,
18 perhaps the fourth alternative would be most appropriate
19 at this time, and I would ask that I be able to read
20 the report and then make a judgment as to whether or
21 not we will make an application for full-scale production.

22 THE COMMISSIONER: All right.
23 Well, we'll leave that to Mr. Scott.

24 MR. SCOTT: I've no objection
25 to that and will arrange it today on the understanding
26 that it is Mr. Veale alone who will read it, and he
27 will not communicate its substance or the particularity
28 of the views in it. I have it and he can see it on
29 that basis.

30 MR. VEALE: With your permission,

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McCart, Minning, Williams
Cross-Exam by Veale

Mr. Commissioner, I would like to proceed to cross-examine on all the areas in Phase 2, despite Mr. Scott's rule-making fetish, because it's difficult for me to stick around for all the other people to precede me.

THE COMMISSIONER: All right.

MR. SCOTT: I have no objection to that, and that was one of the problems of having taught a lawyer in Law School, is that he holds nothing sacred thereafter.

MR. VEALE: That's true, that was a lesson well learned, Mr. Scott.

CROSS EXAMINATION BY MR.VEALE:

Q. My first question would be directed to Mr. Dabbs, but certainly if it's not his area, I'd prefer one of the other panelists to answer the question. On page 3 of the written testimony in the first paragraph it's indicated that if the ground is frozen, the potential for frost heaving due to operation of ^achilled pipeline will be low, whereas the potential for thaw settlement following clearing of the right-of-way or surface disturbance may be high. Now is it fair to say that with respect to the interior route and the coastal route, there is more vegetation on the interior route?

WITNESS DABBS: That's an awfully generalized question. I answer it this way, certainly there is much more of a forested area on the interior route, as there is no forested areas along the coastal route. Whether in fact there is a greater amount of biomass in terms of quantity of vegetation in

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Cross-Exam by Veale

1 one route as opposed to the other, I don't believe
2 anyone would have any hard fact to establish that,
3 but due to the -- if we look at the total length of
4 both routes from Prudhoe Bay to the juncture, I think
5 probably your statement relative to the interior route
6 is correct.

7 THE COMMISSIONER: Excuse me,
8 what was your statement, relative statement?

9 Mr. Veale: My statement was that
10 there was more vegetation on the interior route than
11 the coastal route.

12 Q Would it follow
13 then, Mr. Dabbs, that along the same generalization
14 that it would be, the clearing of the right-of-way
15 would have a greater disturbance relatively on the
16 interior route than along the coastal route?

17 A It does, in my opinion,
18 represent a greater impact on vegetation along the interior
19 route because of the need for the clearing of forested
20 lands, yes.

21 Q Now I understand -- and
22 perhaps Mr. McCart can answer this -- that, or it maybe
23 Miss Minning -- that the borrow pits on the coastal
24 route will generally be in the river beds, but that
25 this will not be the case on the interior route. Is that
26 correct?

27 WITNESS MINNING: A lot of the
28 borrow pits on the interior route will be in bedrock.

29 Q In bedrock. Well, the
30 bedrock then will not be associated with rivers at all?

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Veale

A Some of the sites along the coastal end of the route would be in flood plains, but the sites, as soon as you enter the mountains are mostly in bedrock.

Q I see. Are any of the borrow pits on the interior route near rivers?

A Yes.

Q Would you outline which ones?

A Would you like me to do that right now? I'd have to look at the strip maps and go through, or would you want me to provide that later?

Q O.K., perhaps after the break or something.

WITNESS MCCART: Could I ask, are you talking about both sides of the interior route in its entirety?

Q My primary concern would be with the Yukon section of the interior route.

MR. MARSHALL: Would it be helpful to take one example and work it through? I expect Miss Minning could select an example that fits your case, if that could be of assistance, and we could continue on. I have a problem with undertakings, they tend to pile up and it's difficult to get the responses when they ought to be made.

MR. VEALE: Certainly.

THE COMMISSIONER: Well, just before we leave that, we don't have one of these charts

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Cross-Exam by Veale

1 for the interior route, I take it. I've forgotten what
2 exhibit number this is, but it shows the sources of
3 borrow --

4 WITNESS MINNING: No, we don't
5 have that compiled.

6 THE COMMISSIONER: I think we
7 should have all the -- I think you should tell us
8 when you say "all the sources of borrow along the
9 interior route within Canada are in bedrock" --

10 A These appear on the
11 strip maps and there is a chart in the borrow report
12 which of course gives the number that corresponds to
13 the site on the strip maps. I can, you know, total it
14 up for you, if that's what you want me to do. It is
15 available in the literature.

16 THE COMMISSIONER: O.K. Thank
17 you.

18 MR. VEALE: I'm not clear,
19 Mr. Commissioner, will there be a production of a
20 schedule of borrow pits on the interior route?

21 WITNESS MINNING: It's available
22 in the literature already that is available to the
23 hearing. I can total it up for you if you want to know
24 how many bedrock sites and how many flood plain sites
25 and this sort of thing.

26 Q Could that be done
27 later this morning?

28 A Yes, I think so.

29 MR. MARSHALL: Does that assist,
30 sir, the -- the chart that was filed gives the borrow

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Veale

quantities that are required by a line segments in the various -- the two configurations of the interior route, prime -- the Marsh Fork and the Canning option.

THE COMMISSIONER: Sorry. Oh yes, you have -- you've got -- you mean this chart?

WITNESS MINNING: Yes, there's one chart that has the number of sites, but that chart does not, you know, have the breakdown of whether there's -- it doesn't say that there's ten bedrock sites, three flood plain sites.

THE COMMISSIONER: It's just the information on the first chart, Mr. Marshall, we don't have.

MR. VEALE: Well, Miss Minning, we'll proceed with that after the break then.

Q Perhaps you could tell me, Miss Minning, at this time whether there are any or will be any permanent roads constructed to borrow sites along the interior route?

A Permanent roads that would be constructed appear on the strip maps.

Q I'm asking a factual question. I don't have the strip maps in front of me. Are there any, to your knowledge, permanent roads going --

A I'd have to look at the strip maps myself, I can't remember.

Q O.K.

MR. MARSHALL: Excuse me, sir, Mr. Veale can get that information right off the strip

1 maps. It's there, it's been there for a year and a
2 half.

3 MR. VEALE: Perhaps Miss
4 Minning will be able to provide that information when
5 she's looking at the borrow sites on the strip map.

6 MR. MARSHALL: Well, frankly,
7 sir, I don't think the witnesses should have to do
8 that sort of thing. It's there . Mr. Veale or anyone
9 else can just look at it and the information is there.
10 Why should the witness be required to go back and count
11 up the number of sites?

12 MR. SCOTT: Well, Mr. Commis-
13 sioner, Mr. Veale isn't here every day. It seems to
14 me that at the coffee break I can probably get out the
15 strip maps for him and it may be that he can find the
16 information he needs, or if he can't, then he can
17 ask questions. That's the easy way to deal with this.

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Cross-Exam by Veale

1 THE COMMISSIONER: Let's
2 allow Mr. Veale to pursue this while he's here and with us

3 MR. VEALE: Q Miss Minning,
4 on page 5
5 in paragraph 3 there's a breakdown showing a number
6 of borrow sites, 26, that would be required on the
7 pipeline segment between the Alaska-Yukon border, and
8 Travaillant Lake junction. as compared to 72 borrow
9 pit sites on the segment between Richards Island and
10 the Alberta-Northwest Territories border; do I take
11 it that the 26 borrow sites refers to the coastal route?

12 WITNESS MINNING: Yes.

13 Q Now, if there is a comparison
14 of the mileages for the same segments, it appears
15 to me that that results in a greater number of borrow
16 sites on the section running through the Yukon Territory.
17 Do you agree with that?

18 WITNESS WILLIAMS: On a
19 quick calculation, I would think it's about the same,
20 Mr. Veale. I might be wrong, but I think it's about
21 300 miles from the Alaska-Yukon border to Travaillant
22 Lake, and about 800 miles from Taglu to the border,
23 I think that's just about the same ratio.

24 Q So then, Mr. Williams,
25 you're taking the position that there is no greater
26 requirement of borrow on one segment than the other.

27 A I didn't understand your
28 question that way. I thought you were talking about
29 more borrow pits per 100 miles on one section than the
30 other.

Q That may be a different

1 question, but I put that question to you.

2 A You can probably get this
3 off one of Miss Minning's tables.

4 WITNESS HARLAN: May I add a
5 point here? If you calculate the ratio of borrow
6 pits per mile between the Yukon-Alaska border and
7 Travaillant Lake, it comes out at 11.42; between
8 Richards Island and the Northwest Territories-Alberta
9 border it's 11.84. So they're very similar.

10 Q Well then, my second
11 question, Mr. Williams, what is the answer to that?

12 WITNESS WILLIAMS: Your second
13 question is to compare the amount of borrow required
14 between the Alaska-Yukon border and Travaillant Lake
15 on the interior and coastal routes?

16 Q Yes.

17 A Is that the question?

18 Q Yes.

19 A Can you get that out of
20 this chart, Miss Minning? I'm having a little trouble
21 with it.

22 WITNESS MINNING: I'm not quite
23 sure what the question is any more.

24 WITNESS WILLIAMS: The comparison of borrow
25 requirements, the interior and coastal routes, between
26 the Alaska-Yukon border and Travaillant Lake.

27 THE COMMISSIONER: Your expecta-
28 tion is, I take it, Mr. Veale, that more borrow is
29 required on the interior route?

30 MR. VEALE: That would be my

Clark, Dabbs, Harlan, Hemstock,
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Cross-Exam by Veale

1 expectation. I don't know whether the facts bear it
2 out.

3
4 WITNESS MINNING: I think this
5 chart shows that in Canada it's about the same; if
6 you add, Alaska you are getting more borrow needed on
7 the interior route.

8 Q Simply because of the longer
9 distance then, is that --

10 A There are two factors.
11 It's the distance and the rock work that's needed.
12 Sometimes the compressor sites have to be built in a
13 valley.

14 Q Well, would it not be
15 the case then that we could say flatly that the
16 interior route does require more borrow?

17 A In total, yes.

18 Q Mr. Williams --
19 WITNESS WILLIAMS: Do you
20 have a copy of the chart:

21 "Preferred borrow sites and quantities of
22 material required for construction along
23 various routes,"

24 Mr. Veale?

25 Q Yes, I do.

26 A Well, under the sub-total,

27 "Canada north of 60,"

28 it shows about a million yards more required on the
29 prime route than the interior route. If you take in
30 the Alaska segment, then there is more required on
31 the interior route.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Veale

1
2 Q I see, thank you. Mr.
3 Williams, did you hear the evidence of Commissioner
4 Parker relating to the road use on the Alaska haul
5 road going to Prudhoe Bay?

6 A Yes, I think I did.

7 Q Well, in your evidence
8 yesterday you stated that snow roads, the ones you've
9 been testing at your Inuvik test-site, did not afford
10 as great^a protection to the vegetation when the degree
11 increases, and I understand the degree of the Inuvik
12 test snow road, the highest degree was 16 degrees.

13 A 16%, I think.

14 Q 16%, I'm sorry. Now,
15 you would agree with me, would you not, that on the
16 interior route you're going to run into greater slopes
17 than you would in the construction of your snow road
18 on the coastal route?

19 A Yes sir, but back up
20 to your first statement, I don't think that's what was
21 said. The potential on steep slopes, the potential
22 for disturbance to the vegetation, is greater because
23 of vehicles probably having to use chains and cutting
24 into it. But that doesn't necessarily mean that it will
25 happen. The potential is there if it's not properly
26 maintained.

27 Q Well, if we take the
28 evidence of Commissioner Parker, which stated that the
29 Alyeska haul road is used at night in order that repair
30 to the road may be conducted during the day, it appears

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Cross-Exam by Veale

1 then that there's some difficulty when you begin to
2 haul the equipment, so if we take your statement that
3 you have greater potential disruption in slope areas,
4 my conclusion would be that the interior route would
5 result in greater potential destruction to vegetation
6 as a result of the snow road than the coastal route.

7 A "I would agree with that,
8 yes.

9 Q Now on page 7, paragraph
10 No. 1, it says that Arctic Gas recognizes as a result
11 of detailed site investigations and drilling, which
12 form part of final design, further changes in the route
13 may be indicated for environmental or geotechnical
14 reasons. However, it is anticipated further changes
15 in the proposed route will be relatively minor. Would
16 you agree that the route changes will be more easily
17 accommodated on the coastal route than the interior
18 route simply because the terrain on the coastal route
19 is more homogeneous?

20 A Yes sir. That's on a
21 total mile basis. There are exceptions to that
22 along each route certainly, but on a total
23 basis, you bet.

24 Q Now on page 8 it states
25 that on slopes greater than 3% it may be necessary to
26 provide extra treatment over and above seeding and
27 fertilization to establish an erosion-resistant plant
28 cover. Would you agree that the cost and the relative
29 difficulty of re-vegetation in the interior route is
30 greater than that on the coastal route?

1 A Well, a lot of these
2 steep slopes on the interior route occur in bedrock
3 and talus, and certainly they are impossible or very
4 difficult to re-vegetate. The other areas are in
5 mineral soils and on steep grades I think perhaps
6 Mr. Dabbs can best answer that.

7 WITNESS DABBS: From my
8 personal observations out on the two routes and the
9 height of certain slopes I think perhaps without some
10 greater analysis, but I think I would agree with you
11 that your point is correct,

12 Q Mr. Dabbs, have you in
13 fact developed an alpine reseeding program specifically
14 designed for slopes greater than 3%?

15 A Not specifically an alpine
16 re-vegetation program any different than tundra areas,
17 because of the altitudinal influence on plants is the
18 same essentially as the latitudinal influence on
19 plants. In other words, the further north you go,

20 these tundra areas are roughly comparable to the
21 same situation at higher elevations. So I would not
22 say that there is a specific alpine restoration program.
23 The crossing of the two mountain, major mountain ranges
24 - the Brooks Range and again the Richardsons - and in
25 the case of the Yukon, the Richardsons, the elevation
26 is really not that high; in the case of the Brooks
27 Range it is. However, that crossing is almost entirely
28 talus and currently unvegetated. It wouldn't be a matter
29 of re-vegetation in that case.

30 Q It's your position then,

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Vaale

1 Mr. Dabbs, there is no specific alpine re-vegetation
2 required?

3 A I think the crossing
4 of the Richardsons would require definitely the imple-
5 mentation of all of the very best techniques proposed,
6 and consequently would be an expensive re-vegetation
7 program.

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Clark, Dabbs, Harlan, Hemstock,
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Cross-Exam by Veale

Q On page ten in paragraph number three it is indicated that changes in permafrost terrain can result in an increase in thickness of the active layer and ponding and channelization of surface runoff. Now would you agree this statement in fact favours the coastal route as opposed to the interior because the interior route involves a good deal more disturbance of vegetative cover?

A I am not responsible for this particular portion of the evidence but I would comment that I don't believe that statement was written with that particular view in mind. However I think your assessment is correct.

Q On page twelve, paragraph number four, there is an assumption that the risk of major failure and the pipeline is going to be low and therefore a terrain disturbance from unscheduled repair operations will be low as well. Now would you agree that the access to the coastal route is superior to that of the interior route assuming that some of the equipment in unscheduled repair operations will not be able to make use of aircraft?

WITNESS WILLIAMS: There is at least one area in the Brooks Range that I can think of. Mr. Veale, I am sorry you're speaking of Canada now. I was going to say in the Brooks Range where it is essentially rock that vehicular or passage along the right-of-way in that area would be easier than the coastal route, but excluding that area, I think your statement is correct.

Clark, Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Veale

Q Would it also be easier to operate aircraft along the coastal route than the interior route considering that you have to pass over the Richardson and Brooks Mountain Ranges on the interior route?

A I don't think that we have done a statistical analysis of that Mr. Veale. I have had trouble getting into both areas from time to time in the summer months, but because of the high passes in the interior route I think your assumption is correct.

Q On page thirteen at the last sentence or second to last sentence. "Under adverse conditions it can be anticipated that the development of the frost bulb around the buried pipe may interrupt sub-surface drainage and result in a potential frost heave. Now could the potential interruption of sub-surface drainage particularly on the north side of Crow Mountain which is on the south side of Old Crow Flats, could that result in disturbance of beaver and muskrat habitat in the flats?

WITNESS HARLAN: I wouldn't regard it as a significant problem, no.

Q Why is that?

A We are dealing with permanent frost terrain. There will be only minor amounts of flow, sub-surface flow through the active layer during parts of the year. What there is will be allowed to cross over the pipeline so there won't be great disruption of sub-surface flow.

Clarl, Dabbs, Harlan, Perstos,
McCart, Minning, Williams.
Cross-Exam by Veale

Q Well Mr. Harlan is dealing with what is referred to as on page fourteen in paragraph three, you indicate that if adequate drainage measures are provided the affects would be localized due to the natural variations in the ground surface and in the depth of the active layer. Would you agree that there are many areas along the entire pipeline route of little relief where a few inches of water could in fact cover an extremely large area?

A I don't think I would agree to that point.

Q Why not?

A Because the terrain is not that flat. It is not a plain, it is irregular.

Q No, but if you speak of local variations surely there are areas - -

A It is a matter of scale.

Q Well what scale would you be applying to the comments that I just quoted from the evidence on page fourteen?

A We are talking in ten or maybe up to a hundred feet in terms of local disturbances. We are not talking in terms of miles.

Q Now your indicating then that there is no place along the entire pipeline route where there would be anything in the neighbourhood of a quarter-mile, half-mile or a mile where the relief would be so low and so flat that a great deal of ponding could occur.

A I am not aware of any areas

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in Canada , no.

Q Would your question or your
answer rather depend on the height of the active layer
5 above the actual pipeline. In other words if the active
layer above the pipeline were higher, much higher than
the surrounding area, would that change your opinion?

A No. because of the natural
undulations in the ground surface.

Q Regardless of how high?

A If it reaches some point,
if it reaches three or four feet above ground surface. yes.

Q But if it is two feet above
ground surface?

A Yes. Except it won't be
because of the mound breaks. In other words the natural
topography will be maintained at natural drainages and
at additional intervals.

Q The active layer could be
three feet though. Is that not correct?

A In spots it can be yes.

Q And the only way to avoid
the problem of
having an active layer that high is to have mound breaks?

A I think we are confused here.
The depth of the active layer is the depth below ground
surface. Would you agree?

Q Yes. Oh I see. Maybe you
could elaborate on that. The depth of the active layer
is below ground surface?

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WITNESS CLARK. I think that the confusion arises that you are using the term "depth of active layer" to mean the amount of the active layer that is frozen above the pipe. Isn't that what you're talking/ ^{about}

Q No, I was referring to, my assumption was that in the summer time there was layer that was frozen in the winter that would become active in the summer.

A That's right.

Q That would then be the top layer?

A That's right. It has a certain thickness that varies.

Q That would be above the pipe?

A Yes, there would be less of an active layer above the pipe because of the frost bulb.

Q Well my question was whether or not that active layer being above the pipe is going to cause any problems in surface and sub-surface drainage because of the fact that the land around it may be relatively flat for long distances and Dr. Harlan's point is that it wouldn't make any difference.

A Yes if the ground is flat there would be no flow through the active layer so thickness wouldn't be too important in that case. When it becomes important is on sloping ground where there is a significant flow through it and that flow would be impeded by the frost bulb above the pipe.

Q Okay. Now turning to page

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sixteen of the canned evidence, it is anticipated Mr. Dabbs that four to five years might be required before re-vegetation can be depended upon for protection of the right-of-way and backfill mound. Now is there any difference between the interior and coastal route in this respect in that the interior route requires a greater re-vegetation program?

WITNESS DABBS: No sir let's take this statement and explain it to the inquiry. I think it has perhaps escaped people and why this statement has been repeatedly made. The slides I showed and the evidence in our reports would lead us to conclude that re-vegetation and the replacement of an erosion resistant plant cover can be achieved perhaps as I have shown in such a short time as two months in one growing season. However, as everyone is aware there is quite a natural variability in climate and the extremes in climate are probably more evident in the north than anywhere else. I think from time to time we anticipate there will be years where with low rainfall or very cold temperatures or some such other climatic events which will result in the reduction of plant cover or at least the slowing of that re-establishment and when the question was asked by the geotechnical people of ourselves, would you people guarantee a plant cover in one or two years and stake your life on it. And I said no I wouldn't in one or two years even though all of the evidence to date would indicate that this is entirely possible. However, we are confident that within the time period of four to five

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years that there will in fact be.

Q That would be regardless of
weather conditions?

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2 A That is taking into
3 consideration weather conditions. Now, I'll get to
4 your question shortly perhaps -- but it's
5 an important point that I believe the people here should
6 understand. We have been asked in what area do you
7 view the recovery or the replacement of a plant cover
8 to be the slowest. Clearly, that must be tundra areas
9 as indicated clearly by nature itself. The difficulty
10 for the growth of plants and consequently this is the,
11 I believe, very, very conservative estimate for the
12 most difficult portion of the pipeline/^{route} which is the
13 tundra areas. Consequently, this relates principally
14 to the North Slope route rather--and the interior
15 route. I personally would predict a shorter time period
16 than this.

17 Q Is it possible then that
18 weather conditions could be such for a period of years
19 that it would completely frustrate your efforts to
20 re-vegetate?

21 A Our analysis of climatic
22 records--of the DEW line sites, the town sites of
23 Inuvik and Tuktoyaktuk which, in those larger cases,
24 date back in the forties--perhaps even earlier--do
25 not show ever or at least in the recorded record,
26 four or five years of continuous weather conditions
27 which would result in complete frustration. I believe
28 1970--if I recall the figures correctly--1974 was in
29 fact the coldest for a growing season in the Inuvik-
30 Tuk area. At least in the numbers of days of frost

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1
2 would indicate 1974 was the coldest season on record
3 in either of those communities. And, as you see, 1975
4 records indicate it was a relatively warm season so
5 there is to be nowhere in the climatic records indica-
6 tion that there would be a four or five-year frustration.

7 Q Have any of your tests
8 indicated that although your seeding may be well
9 established in the first year that, in fact, the erosion
10 and protection that it provides deteriorates in the
11 second, third, or fourth year?

12 A I think we have discussed
13 this and shown that certainly in the / ^{data} varieties which
14 will provide the initial erosion control do incline.
15 At the same time, however, the native species invade
16 and colonize and stabilize that area in compensation
17 with the decline of the seeded grasses.

18 Q How long do native grasses
19 take to re-colonize?

20 A Of course, this is
21 variable over the length of the pipeline route but
22 in your own case, you are interested in the Yukon, the
23 disturbances, for instance, in the Richardson Mount-
24 ains area and the Eagle Plains may be three or four
25 years. The first couple of years certainly are rela-
26 tively bear on seismic disturbances--the older seismic
27 disturbances--but in about that time period, the grasses
28 which have been named as those that we would like to
29 use have colonized these areas. The coastal route is
30 slower.

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1
2 O Mr. Williams, perhaps
3 you could tell us if Arctic Gas has a policy with
4 respect to the access roads from the Dempster Highway
5 to the interior route. Upon completion of laying the
6 pipe, would those roads be closed as a matter of
7 policy by Arctic Gas?

8 WITNESS WILLIAMS: I wouldn't
9 think so, Mr. Veale. I would see that these--the
10 rights-of-way for these roads would be obtained through
11 a land use permit from the regulatory authorities. It
12 would be the--if there was a brush in the area it
13 would have to be cleared to make the snow road. When
14 the project was finished with the road, restoration
15 procedures would go forward in the areas required. And
16 it would be left to the satisfaction of the regulatory
17 authority issuing the land use permit and it would,
18 whether it stayed open or closed, I don't think
19 would be within the jurisdiction of the applicant.

20 Q Would not be or would be?

21 A Would not.

22 Q Dr. Harlan, on page 17,
23 paragraph number 1, there is a comment that normal
24 dispersions of subsurface flow downslope of the
25 pipeline will act to minimize the effect of local
26 interruptions of flow and changes in soil water con-
27 ditions. Is there not a contradiction in that
28 statement to the extent that once the pipeline is
29 constructed there will not, in fact, be normal
30 dispersion?

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1
2 WITNESS HARLAN: I am not
3 sure I follow you. On the upslope side of the pipeline
4 the active layer over the pipeline will be greater
5 and there will be some redistribution of subsurface
6 flow. On the downslope side, the natural dispersion
7 processes will continue.

8 Q However, they will be
9 enhanced by your mound breaks. I mean, if, in fact,
10 the normal dispersion will never take place once the
11 pipeline is constructed.

12 A I am not sure I follow
13 you on that.

14 Q Well, you have mound
15 breaks at fairly frequent intervals?

16 A Yes.

17 Q Well, doesn't that
18 completely--

19 A These would be located
20 in the natural depressions--areas in which natural
21 drainage occurs anyway.

22 The fact that this is
23 done will not affect the natural dispersion processes?

24 Q And you are confident
25 that the flows through the mound breaks will not be
26 any greater than the natural flow would have been?

27 A That is correct.

28 Q You are sure that is going
29 to take place? I mean if the water ponds to any
30 extent, you are going to have a greater flow through

Clark, Dabbs, Harlan, Hemstock
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1 the natural drainage system than you would have had
2 prior?
3

4 A I am having difficulty
5 following your question. Yes, there will be minor
6 amounts of groundwater flow concentrated through the
7 mound breaks. This amount of flow is much less than
8 you would get due to, say, a summer storm.

9 So the incremental increase
10 would be very, very small.

11 Q Further down on page 17,
12 it indicates that only 7% of the proposed alignment is
13 on cross slopes greater than three degrees. Now, you
14 have provided us with an example there of Travaillant
15 Lake to the Alberta-Northwest Territories border. Now,
16 what would the case be for the interior route from
17 the Alaska-Yukon border to Travaillant Lake? Now, if
18 you can't answer that now, I would ask for an under-
19 taking to provide that information.

20 WITNESS CLARK: Mr. Veale, I
21 think we've provided that at the geo-technical panel.
22 I can't recall if it was cross slopes or slopes near
23 the pipeline but in the one instance for the
24 segment of the interior route, it was about double our
25 average.

26 Q You are talking about
27 14%?

28 A I would think it would
29 be something like that, but we could--we have looked
30 at that. I am not sure if we did provide the cross

Clark, Harlan, Hemstock, Dabbs
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1
2 slope figure. I could seek it out if you like.

3 Q Thank you. On page 20
4 it states that the applicant has examined in the field
5 all winter crossing and has observed that the beds of
6 the majority of rivers consist of non-frost susceptible
7 gravel. Can you advise us of the rivers then that have
8 frost susceptible gravel and I am particularly interested
9 in the Yukon section?

10 A It should have read " Non-frost
11 suscep-
12 / tible soil which is gravel." I don't think there would
13 be frost susceptible gravel. And I don't think we
14 could advise you of which rivers might have other
15 soils underneath which are frost susceptible at this
16 time. We do have a good record of the exposed bed
17 materials but we don't have drilling below those exposed
materials.

18 Q You say it is not a simple
19 process of elimination as it appeared from that state-
20 ment?

21 A No.

22 Q Just for Mr. Scott's
23 benefit, I am concluding my cross-examination and
24 leaving the terrain aspect and now entering the water
25 area.

26 THE COMMISSIONER: Time for
27 tea, then.

28 (PROCEEDINGS ADJOURNED FOR MORNING RECESS)
29
30

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. VEALE: Q So I'll
proceed then to question Mr. McCart before Miss Minning
has her answer on sources of borrow. But on page 30,
Mr. McCart, there is a statement that there are areas,
paragraph 3, there are areas of less significant ground
water activity on the interior route to the west of the
Northwest Territories and the Yukon border. Have you
identified these areas? Can you relate them to us now?

WITNESS MCCART: I think Dr.
Harlan should possibly answer that.

WITNESS HARLAN: The area
which we refer to here are on the drainages of the Rat
River and also the Peel.

Q They're right in the
river then, is that correct?

A They're on the drainage.

Q When you say "on the
drainage", what is the location?

A They're manifested in the
river itself. They're just to the west of the pass.
These are the ones on the pipeline route.

Q I see. Are there any
groundwater sources then on the interior route which
are not associated with rivers?

A Not in the proximity of
the pipeline route.

Q So there are none then
that you're going to resort to, or Mr. Williams might

Clark, Dabbs, Harlan, Hemstock
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1 resort to for water to make snow or whatever?

2 A I wouldn't think so, no.

3 These are fairly minor springs, and groundwater flows
4 associated with these.

5 Q So then the major water
6 sources then in the interior route would be from
7 rivers.

8 A That's what I would
9 anticipate, yes.

10 Q And which rivers would
11 be the primary sources then for water?

12 I understand some of
13 them are frozen to the bottom during the winter.

14 A I'm not sure what has
15 been listed in the construction plans.

16 WITNESS WILLIAMS: I could
17 only answer that generally, Mr. Veale. Water would
18 be taken from any stream that was shown that it wouldn't
19 disturb fish populations or endanger fish populations,
20 or any pond similarly, as we said several times. The
21 highest requirement is in the early part of the year
22 before the streams are frozen to the bottom. We haven't
23 done a detailed analysis of where water will be taken.
24 This is part of final design and will be done at that
25 time.

26 Q Perhaps then Mr. McCart
27 can tell us where water should not be taken from, and
28 that would determine where it will be taken.

29 WITNESS McCART: I would
30 suspect that the Porcupine River would be the major

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1 source of water. I don't think there would be any
2 difficulty in taking water from that stream
3 There are a number of other streams in the area in
4 which there are winter flows -- the Rat River, this is
5 the Rat River which is within the Porcupine drainage
6 and not the Rat River which is part of the Mackenzie.
7 There is some water in the Bell River during the
8 winter. It's not open water but apparently there is
9 a flow under the ice in that particular area. There is
10 a possibility that there are overwintering fish in
11 that particular drainage.

12 Q. And you have no concern
13 then with taking water from the Porcupine River?

14 A Not, no, I don't, there's
15 a very large flow, relatively large flow, and there's
16 no evidence that I am aware of that the areas within
17 the stretch of the Porcupine River parallel to that
18 pipeline are especially important, or that there are
19 critical areas within there which might be affected by
20 water removal.

21 Q Well, Mr. Williams, could
22 you just outline how that water will be transported
23 from the river to the line? It's quite a number of
24 miles in most cases, from the river.

25 WITNESS WILLIAMS: This would
26 be via snow roads using trucks or sleds, Mr. Veale.

27 Q Well, do you anticipate
28 the construction of more snow roads than are indicated
29 on the present map of the interior route? As I see it,
30 there are two snow roads presently running, they run

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1 up from the Dempster to the line, one by Old Crow and
2 one by LaPierre House. You anticipate the construction
3 of more snow roads then?

4 A Yes sir.

5 Q And the snow roads would
6 be on a direct line from the pipeline to the Porcupine
7 River?

8 A Some of them, yes.

9 Q But you have not at this
10 point determined the location of the snow roads?

11 A No sir.

12 Q At the hearing in White-
13 horse, Mr. Williams, we had discussed the point that
14 -- and apparently you had indicated you were somewhat
15 amazed at the amount of water that was required for
16 the coastal route as compared to the interior route,
17 and as I recall, the figures were 10 billion barrels
18 for the coastal route and 3 billion for the interior
19 route. Do you recall those figures, and do you stand
20 by them now? It was in the applicant's material itself,
21 the water requirements for the various routes.

22 A No, certainly not
23 billion barrels, Mr. Veale.

24 Q It could have been million

25 A It could have been million

26 Q Why the discrepancy then
27 between the two routes?

28 MR. MARSHALL: Well, perhaps
29 we could, if one of the other panel members has some
30 information on the amount rather than leave it out

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1 by perhaps a multiplier of 1,000 or so, we should
2 clear up that point.

3 MR. VEALE: Certainly.

4 MR. MARSHALL: Dr. McCart,
5 do you have some information on that?

6 THE COMMISSIONER: Dollars come in
7 billions but water--

8 MR. VEALE: What's a billion,
9 Mr. Commissioner?

10 WITNESS McCART: I think in
11 the responses to the questions from the Assessment Group that their water
12 requirements are shown for segments of the route and
13 spread "C", now I have some data for spread "C" which
14 is the first segment on the coastal route just inside
15 the Canadian border, and it comes out to be about
16 1.3 or 1.2 million barrels total required for that
17 particular spread.

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This is just a rough calculation. It is a sixty-five mile spread and it is 1.214 million barrels, one million, two hundred and fourteen thousand barrels is a rough calculation that I made from the data that is included.

Q Well perhaps we could have an undertaking to -- I have asked the question once already and did not have an adequate answer to why there was any discrepancy between the water requirements for the coastal route and the interior route as it is in the Yukon Territories. Perhaps Mr. Marshall would undertake to provide an answer for that?

MR. MARSHALL: It is not clear to me what you are looking for? Why is there more water that is required for one route than the other route?

MR. VEALE: Yes.

MR. MARSHALL: Well maybe the party can answer that.

WITNESS HARLAN: I believe I am partly saying that there is quite a bit of difference in the snowfall characteristics. In the interior route I believe there is greater snowfall and it comes a little earlier and this would account for the large portion of the difference.

Q In other words you the snow road requirements is at issue here and that if there is more snowfall you need less water? As simple as that?

A Yes.

Q Well I still, if that is the

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4 explanation for the discrepancy finally Mr. Marshall that
is fine with me. But it seems to me that it is a matter
of greater importance than relying on an answer off the
cuff and I would prefer to have your undertaking to
provide an answer, maybe in phase three where it will
become an issue as well.

MR. MARSHALL: I am sorry
Mr. Veale, I haven't zeroed in precisely on what it is you
want.

MR. VEALE: Well --

MR. MARSHALL: You want us to list the water
requirement for the coastal route as against the water
requirement for the interior route?

MR. VEALE: Yes.

MR. MARSHALL: And then explain what the
differences are; why one is more than the other?

MR. VEALE: Yes. It appeared to me and
I am going by memory now that the water requirement was
three times larger on the coastal route than on the
interior route.

MR. MARSHALL: Now do you want this figure

for --

MR. VEALE: No, no I was interested
primarily in the Yukon segment.

MR. MARSHALL: Yes, the section where the
2 Canadian side meets the border?

MR. VEALE: Yes.

MR. MARSHALL: Mr. Williams can you get that
information?

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WITNESS WILLIAMS: Yes I think we would have that after lunch probably. I would like to look at the Whitehorse figures. You say Mr. Veale these were figures that were published in the direct testimony at Whitehorse?

MR.VEALE:As I recall.

A I think perhaps you right but I have forgotten the reasoning now and I would like to look the figures up and give it to you after lunch.

MR.VEALE: Just to clarify that matter, will the answer be given after lunch or will Mr. Marshall provide a more detailed answer at the next phase?

MR. MARSHALL: We'll give you what we can right after lunch and if it doesn't meet your needs and you require additional information we'll see what we, we'll do the best we can Mr. Veale.

MR.VEALE:Thank you. On page forty on paragraph number two there is a reference to water methanol testing of pipe and then disposal of that water or methanol concentration on ice over a large water course. Now perhaps Mr. McCart can indicate whether that disposal would take place on the Porcupine River on the interior route.

WITNESS MCCART: I think this statement was aimed primarily at the MacKenzie River and I personally have no knowledge to dispose of methanol into the Porcupine.

Q Perhaps then you could advise or Mr. Williams could advise where the methanol concen-

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tration will be disposed of on the interior route?

WITNESS WILLIAMS: Dr. McCart

is certainly right that that statement was put in there
with the Mackenzie River and is under consideration.
However it were found that this method of
disposal was acceptable on the Porcupine River, then it
would be considered but that is an analysis that really
hasn't been done.

Q I see.

A That doesn't answer your
question I don't think. If it is not acceptable then the
test medium would have to be distilled, the methanol
removed from the water down at least to this one percent
concentration before the effluent was disposed of.

Q In what?

A Probably in water. Yes and
the methanol then either hauled out or burned.

Q Well Dr. McCart does that
create any difficulties on the interior route to respect
to fish populations?

WITNESS MCCART: Disposing of
1%. It says here residue containing less than one
percent not if the dilution factor is quite high which
it would be. I think the plan is to dispose of this
stuff during high discharge stage so you would have a
very, very concentration of methanol remaining. I might
add that we have done considerable work on methanol
toxicity and we are in fact planning on a short series of
additional experiments and we are fairly satisfied that

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with high dilution rate, there would be no problem as far as toxicity goes. It is not a highly toxic material.

Q But your answer would indicate that it shouldn't be something that would be dispersed into a watercourse during the winter when the flow would be the lowest?

A No, I think this implies that, we would expect much of material would remain at the surface of the ice and it would, the major mixing would occur during the spring. In the MacKenzie incidentally even during the winter there is such a high volume that it should be fairly easy to regulate the output of the distillate.

Q Well Dr. McCart on page 44, you have indicated that the natural spring breakup sediment loads greatly exceed or will greatly exceed the introduced sediment loads.

THE COMMISSIONER:

What page was that on again?

MR. VEALE:

Page 44. It is the second line of that page.

Q I would take issue with that statement simply because the high natural sediment loads occur during high water periods and therefore a water course can absorb them and it appears to me that the introduced sediment loads will take place at periods other than high water periods and therefore the impact could in fact be greater than the natural sediment loads. Is that not correct?

A Yes and we have made that

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point adnauseam I think in our writings particularly in volume.

Q It is a substantial misinterpretation.

A Yes it is and certainly this statement here doesn't make that particular point. It does however make a point which is valid that introduced loads are in fact going to be less than those which occur naturally, which is true. If you are looking at an annual cycle but it is certainly not true if you are looking only at the winter period when natural loads are extremely low. I think I made the point yesterday that we are concerned whenever the introduced load exceeds that which is usual at that time of year. In other words, as I was making that point yesterday these, the life cycle of these fish and other animals is adapted to the natural cycle and we are concerned whenever sediment loads would exceed that which occurs at that, would normally occur at that time of year during the natural cycle. So I would agree with you.

Q Well the analogy has been made on page 42 that the east bank of the Mackenzie River has been selected for the pipeline because of the fact that the elevation is greater and there is greater runoff on the west bank. Now because the elevation is greater on the interior route as opposed to the coastal route, does that make the interior route less desirable for the pipeline?

WITNESS HARLAN: I think there is a misinterpretation on the statement on page 42. It

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streams
states that the fact that the are more stable and the elevation is less on the east side it is a beneficial factor. It doesn't state that it was a governing factor in the determination of the route.

Q Well then is it a beneficial factor with respect to the interior and coastal route?

A On the basis of my knowledge the streams on the interior route in Canada are more stable than on the Arctic coast.

Q Do you agree with that Dr. McCart?

WITNESS MCCART:

A I think generally yes if you are talking about bank stability and maintainance of a channel rather than sort of meandering braided streams you have on the north slope. In that sense it is true. Yes.

Q So the runoff then on the coastal route is no greater than the runoff on the interior route?

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1 WITNESS HARLAN: I didn't
2 state that, I'm sure.

3 Q Well, that's what the
4 evidence -- the evidence, you see on page 42, states:

5 "The runoff on the West Bank tributaries
6 tends to be higher than the East Bank tri-
7 butaries, therefore it is a beneficial
8 factor to locate on the east side of the
9 Mackenzie."

10 A That's correct.

11 Q Now I'm asking you --

12 A There's also a difference
13 in drainage areas.

14 Q I'm asking you if the
15 runoff on the interior route through the Yukon Terri-
16 tory is going to be greater than the runoff on the
17 coastal route, and whether that would be a factor
18 in location of the pipeline.

19 A Not runoff per se, no.
20 I'm not sure of the comparison. I think if you compare
21 it on a per square mile basis you'd find the runoff
22 fairly similar, for the drainage areas on the
23 interior route as opposed to the coastal route. On the
24 coastal route the streams tend ^{to} be flasher, in other
25 words higher peaks than you would find on the interior
26 route. So from a hydrologic point of view, we might
27 tend to favor the interior route over the coastal route.

28 Q I see, so the analogy
29 does not hold.

30 A No.

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1 Q Well on page 59 there
2 is a reference to noise levels. The statement is that:
3 "Noise levels will be intensive at times
4 during the construction period but should
5 result in only short -term losses in environ-
6 mental quality. Typical construction worker
7 noise exposure standards will be complied with
8 and the virtual absence of wildlife during the
9 construction period will preclude significant
10 adverse effects on them."

11 Now would anyone on the panel explain what is meant by
12 the phrase:

13 "The virtual absence of wildlife,"
14 is that before or after the noise?

15 WITNESS HEMSTOCK: This was
16 simply referring to the fact that the construction of
17 the pipeline is planned for winter and that along the
18 prime route there is very little wildlife in the area
19 at the time of construction.

20 Q So you stand by that
21 statement?

22 A Yes.

23 Q Now, what effect on that
24 statement does caribou migration have?

25 A Well, there are very
26 few caribou in the coastal route, the prime route area
27 during the time of winter construction. There has been
28 a few in the Northern Yukon, but in terms of the total
29 Porcupine herd, they are very small numbers. So that
30 we would still say that there are very little wildlife

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Veale

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in the area.

Q That statement then is with respect to the coastal route then and not the interior route?

A Yes, we are referring here to the coastal route. In the interior route there are some sections, of course, where caribou would be in the general area of the pipeline route during construction.

Q Perhaps Mr. Commissioner, we could now have Miss Minning's answer on the borrow pits.

WITNESS MINNING: In Canada on the interior route, there are 19 borrow sites, of which 11 are in bedrock, one is an alluvial meander plain, three are in active flood plains, two are in alluvial terraces, and two are in outwash terraces. The river or creeks that would be near these sites that are either alluvial meander plains or active flood plains are Schaefer Creek, Driftwood River, Berry Creek, and Rat River. I might point out that these flood plain deposits represent four of ten intermediate borrow sites which -- of which only 980,000 cubic yards of material are needed, of which only 15,000 cubic yards of No. 1 material are needed, which would be approximately 1,000 cubic yards for each one of those sites, which ^{means} 4,000 cubic yards of good quality material from those four deposits.

Q They are relatively minor deposits is your statement?

1
2 A That's correct, and in
3 some cases they might not even be needed. Those are
4 deposits to supply intermediate borrow needs.

5 Q Intermediate borrow
6 needs, that means what?

7 A That means borrow needs
8 between compressor sites.

9 Q So the bulk of your borrow
10 requirements will come from bedrock areas.

11 A That's correct.

12 Q Mr. Williams, on the
13 interior route there is going to be an all-weather
14 road to Whitehorse running from Milepost 443 to the
15 Dempster Highway, and hence to Whitehorse. Now that
16 will be a permanent access road. I presume it will be
17 built to the standards of the Dempster Highway.
18 Is that correct?

19 WITNESS WILLIAMS: Approximately
20 ly the same standard, Mr. Veale, yes.

21 Q And as with your other
22 access roads, you have no plans to close that road off
23 after your construction requirements are met, in other
24 words you will leave it up to the government authorities

25 A Well, I can't speak for
26 CAGSL, Canadian Arctic Gas, Mr. Veale, but there has
27 never been any discussion with them indicating their
28 intent to close them off, no.

29 Q Does anyone on the panel
30 speak for CAGSL?

WITNESS HEMSTOCK: I would think

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
CrossExam by Veale
Cross-Exam by Hollingworth

1 that we would have very little to say about it, but that
2 we would be required by government authorities to leave
3 the road in whatever condition they consider best, and
4 I think that's as far as we can go.

5 Q Are you aware of whether
6 or not that road would have any further impact on
7 caribou migration?

8 A Yes, from the wildlife
9 standpoint, I think that any intrusion into the area
10 occupied by caribou would simply provide greater access
11 of hunters and greater numbers of people into that
12 area, and with a detrimental effect on caribou.

13 MR. VEALE: Well, Mr. Commis-
14 sioner, subject to having possibly a further question
15 after discussing the water question with Mr. Williams,
16 I have no further questions.

17 MR. SCOTT: Ladies and gentle-
18 men , let me just see if I --

19 MR. HOLLINGWORTH: Excuse me,
20 Mr. Scott, I think I just spoke to you yesterday about
21 asking one question on Table 2.

22 MR. SCOTT: Oh yes, I'm sorry.

23 MR. HOLLINGWORTH: That was
24 filed yesterday, Mr. Commissioner. I would say at
25 this time that I'd like to have an opportunity to have
26 our consultants look at the new table because there are
27 no fewer than eight new seed mixes of a total of 15
28 that have been placed on this Table 2, but I do have
29 one question for Mr. Dabbs:

30 CROSS-EXAMINATION BY MR. HOLLINGWORTH (CONTINUED):

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Hollingworth

1 Q If you will recall, sir,
2 we were discussing the mixture of timothy, and I believe
3 the rate that was being applied was 34 kilograms per
4 hectare, I've corrected my pronunciation. I now
5 see that this has been dropped in the forest tundra
6 region, medium erodibility zone to 11 kilograms. What
7 is the reason for this drop?

8 WITNESS DABBS: Sir, it
9 wasn't a drop, it was a mistyping. The boreal creeping
10 red and the engmo timothy were reversed by the typist
11 of the table.

12 Q On the new table or the
13 old table?

14 A The old table was
15 incorrect apparently, and this is in its correct
16 position.

17 Q Well, in light of this
18 change to its correct position, are you still prepared
19 to stand behind your position that 34 kilograms per
20 hectare of timothy would be a proper amount to apply?

21 A I'm sorry, if I came to
22 a conclusion under pressure of questioning while
23 dealing with a table that I wasn't aware contained
24 errors, I would have to correct any statements that
25 appeared incorrect in our first discussion, as I
26 have discussed each of these now with Dr. Younkin,
27 and these are the correct figures.

28 MR. HOLLINGWORTH: O.K., fine
29 thanks. That's all, sir.
30

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

MR. SCOTT: Ladies and gentlemen,

let me see if I can characterize the position in which
we find ourselves, and if anybody disagrees with my
characterization I hope you'll be frank and say so
early so we can have it clear how we stand.

CROSS-EXAMINATION BY MR. SCOTT:

Q It's this, that tradi-
tionally a great project of this type has been prepared
and vetted and submitted by engineers and

(con't)

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 the environmentalists, traditionally, have stayed in
3 their ivory towers or wherever they are and reserved
4 the right to criticize the project either before,
5 during or more usually after its construction and
6 that has given them a certain freedom to criticize.
7 Now, it seems to me that the dominant public
8 characteristic of this project is that it is asserted
9 by its proponents that it is a project that is envir-
10 onmentally found or safe or within margins of reason-
11 able safety. And the assurance of that is not the
12 sayso of the engineers but rather the sayso of the
13 distinguished environmentalists who are on this panel
14 and who will be on the next panel. So, if I understand
15 the matter correctly, the environmentalists are to
16 a certain extent to appear before us here today a
17 good housekeeping seal of approval on this particular
18 project. Now, does anybody disagree with that? As
19 a general proposition?

20 MR. MARSHALL: Mr. Scott,
21 surely that is something that is either apparent or
22 is not apparent after all, the evidence is in and the
23 cross-examination is done. That's why we are all here.

24 MR. SCOTT: The reason I
25 raised the question is because that is the way the
26 project has been presented and I trust that if any
27 environmentalist or anyone in those disciplines has
28 any reservation --no matter how minor--about any aspect
29 of the project, he will feel free to say now because
30 his failure to do so may make it difficult for him

Clark, Dabbs, Harlan, Hemstock
 McCart, Minning, Williams
 Cross-Exam by Scott

to do so later. What I want to get out is that I don't see and I'm sure Arctic Gas has the same view. I don't see the environmentalists on this panel as the hired guns of the applicant. I see them rather as respectable, highly-professional and highly-qualified experts who examined the project for Arctic Gas and who have said that within acceptable limits no environmental harm of consequence will be done. Now, is there any person on this panel who thinks I have mis-stated his role?

MR. MARSHALL: Well, I think you really are entitled to make whatever assessment of it you like. You can ask each of the individual environmentalists and I think there are two of them on this panel what their role has been, Mr. Scott, but I think it is unfair to put it on that basis:

MR. SCOTT: Well, let me put it this way.

THE COMMISSIONER: Excuse me.

Do you mind if I get into this for a minute? The Environment Protection Board gave evidence here in June. They have reservations about the project based presumably not on the fact that they are not being paid by Arctic Gas.

MR. SCOTT: Yes. They are.

THE COMMISSIONER: The funds come from there but there are no strings attached. At any rate, the funds are still flowing, I don't know but they said that the project in its present

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Clark, Dabbs, Harlan, Hemstock,
McCart, Minning, Williams
Cross-Exam by Scott

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2 form was unacceptable to them from an environmental
3 point of view. That is their professional opinion.
4 Now, Mr. Scott, as I understand him, is saying to these
5 ladies and gentlemen, you are professionals. Presumably
6 if you have any reservations, as the Environmental
7 Protection Board has, you feel free to state them.
8 Just because you are employed by Arctic--or at least
9 retained by Arctic Gas or employed by Arctic Gas or
10 N.E.S. or anybody else connected with the project
11 doesn't mean that you feel that you are bound to
12 support it in all its aspects even if your own opinion is
13 that it isn't supportable in some way.

14 MR. MARSHALL: Well surely,
15 sir, that goes without saying with professionals. They
16 state what their opinion is and if Mr. Scott wants to
17 ask them whether or not they feel free to state their
18 professional opinion, I welcome him asking that question.

19 THE COMMISSIONER: That is
20 what I thought he was getting at. And you see, he
21 said they weren't hired guns. Lawyers don't state
22 their opinions. Lawyers are, in a sense, hired guns.
23 We are not interested in your opinions. You are
24 here to put the best face on your client's project
25 and others here to put the best face on their client's
26 own interest. So, why can't Mr. Scott just say to
27 them collectively or individually, "Well, do you have
28 any reservations about this?"

29 MR. MARSHALL: I'm sure he
30 will.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

MR. SCOTT: Now, before Mr.

Commissioner, when we get to that, any specific
reservations, I want to be sure that I have characterize
their role correctly. Do the environmentalists that
we have on this panel and we will deal with the others
on the next one later see themselves as persons who
are hired guns in the sense which you, sir, have des-
cribed the hired guns--someone retained to put the
best face on a project or do they see themselves as
perfectly^{free} to express publicly here any reservations
they have about the impact of this project within
their discipline? Now, if the answer to that is "yes,
we see ourselves in that latter capacity," we can then
proceed.

WITNESS McCART: Well, I
certainly see myself in the latter capacity.

Q Right.

WITNESS DABBS: And I would
concur with Dr. McCart.

Q All right. Well then,
that's fine and I trust that there--as far as you
are concerned--there will be no reservation in
expressing any qualifications you may have about the
environmental impact of the scheme on the understanding
that in a practical public sense, this will be your
last opportunity to do so apart from the National
Energy Board.

A I have no reservations.

MR. MARSHALL: Mr. Scott,

Clark, Dabbs, Harlan, Hemstock :
McCart, Minning, Williams
Cross-Exam by Scott

I think you've given offence to that eminent environmentalist, Dr. Williams, because you haven't put the question to him.

MR. SCOTT: Well, well now, let me see if, as we're concerned with environmental matters I can begin with some very general and trite propositions and I'll put them to Mr. Hemstock and if he agrees with them, if anybody has a reservation about them, you let me know. There is six or seven and they relate to basic concerns in attempting to evaluate the impact of a project of this type in the environmental area.

Now, first is the principle that the land or the landscape should not be unnecessarily disturbed and this applies, not only in areas of high sensitivity, but anywhere. Is that a principle in environmental planning that you would adopt?

WITNESS HEMSTOCK: Yes, that's a good principle.

Q Anybody disagree with that

WITNESS DABBS: No, I wouldn't.

Q That visual and aesthetic values should be protected and visual impacts minimized?

WITNESS HEMSTOCK: Yes.

Q Any disagreement?

Three, that present wilderness areas should be protected and disturbance of such areas should be minimized?

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Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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WITNESS HEMSTOCK: I would agree with that in principle but I would like to know your definition of wilderness.

Q By wilderness, I don't mean wilderness with a capital "W" which is the way we described it in relation to Alaska but rather wilderness meaning untouched or unspoiled or untrod upon area.

A Yes, I would agree with that.

Q Fourth, that disturbance of the ground surface together with the organic mat and the vegetation that protect it should be minimized as a means of reducing or avoiding a wide range of environmental impacts and engineering problems?

A Yes, I would agree to that.

Q Any disagreement ?

Next, that resources that may be in short supply should be conserved, that they should be used prudently and that conflicts must be avoided between the use of such resources for one project and other present or future uses of the same resources and priorities therefore established.

A Yes, I would agree with that.

Q Any disagreement with that?

Next, that any overlap of project lands or lands used by or useful to man for other purposes, either past, present, or future, should be

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 minimized and conflicts in land use should be avoided
3 where possible.

4 A Yes, I would agree with
5 that.

6 Q And then, next, archaeolo-
7 gical, historical and other special or environmental
8 sites should be protected from disturbance by the
9 project and in the case of archaeological materials
10 where they cannot be protected, they should be salvaged.

11 A Yes.

12 WITNESS McCART: I don't know
13 what an environmental site is.

14 Q I'm sorry I read it
15 incorrectly, Dr. .McCart, I think you are quite right.
16 Any particularly sensitive environmental site such as
17 a staging area or what have you for geese.

18 A And what was the latter
19 part--should be protected from what?

20 Q From disturbance by the
21 project.

22 A I would say unnecessary
23 disturbance.

24 THE COMMISSIONER: I missed
25 something. I thought the the last part related to
26 archaeological sites.

27 MR. SCOTT: Archaeological,
28 historical, and other environmentally sensitive that--
29 it shouldn't say "and other"--and environmentally
30 sensitive sites.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 WITNESS HEMSTOCK: In your
3 interpretation of environmental sites, I was thinking
4 of something like an I.B.P. site that was set aside
5 for a specific scientific reason. That sort of thing
6 should be protected.

7 Q Well now, Dr. McCart, when
8 you say that they shouldn't be unnecessarily disturbed,
9 I take it that the judgment as to whether the distur-
10 bance is appropriate or not is one that you make rather
11 than one that an engineer makes?

12 WITNESS MCCART: Yes, I would
13 agree to that. This situation-- Well let me terminate--

14 Q Well, let me put it
15 this way. If, for example, the engineers say we must
16 go through River X in such a way that there will be
17 tremendous silt loads, it is you who will make the
18 judgment as to whether that is environmentally sound?

19 A Yes, it strikes me that,
20 you see, you have to determine what is environmentally
21 unique and what is environmentally unique about an
22 environmental area that has been set aside should be
23 protected and preserved.

24 Q Yes, but you are not
25 concerned surely to--and I take it the other environ-
26 mentalists--aren't concerned purely to protect things
27 that are environmentally unique?

28 A Of course, that is why
29 one defines an environmentally sensitive area because
30 there is something uniquely sensitive about it or there

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 is something there that does not occur elsewhere or
3 something of that nature. And that is what I think
4 should be preserved in those sites.
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Clark, Dabbs, Harlan, Hemstock
 McCart, Minning, Williams
 CrossExam by Scott

1 Q But you subscribe to the
 2 other principles that have been read, which apply beyond
 3 environmentally unique areas to minimize impacts of
 4 projects of this type on those areas, whether they be
 5 regarded by a biologist as being unique or not.

6 WITNESS MCCART: I would say,
 7 O.K., one through 6, I would certainly agree with that,
 8 7, yes, those aspects of that area which are unique.

9 Q All right.

10 THE COMMISSIONER: May I ask
 11 you a question before you go onto your next?

12 Q At the University of
 13 Calgary there's a Faculty of Environmental Design.
 14 Now, when some of you answer to the description
 15 "environmentalist", is there a -- you see, there are
 16 lots of people in this room who aren't, who don't
 17 have degrees in anything, who might say, "I'm an
 18 environmentalist, I believe in protecting the environ-
 19 ment." Candidates run for public office on the ground
 20 they are environmentalists and that means that they've
 21 participated in some public campaign to save something
 22 or other. Now, engineers seem to be excluded from
 23 this category. None of them responded, only Mr. Dabbs
 24 and Dr. McCart responded, and Mr. Hemstock. Is there
 25 a merging, a profession, or an academic qualification
 26 known as "en_vironmen_talist", or is it just a word
 27 that's sort of heaved around by anybody who gets the
 28 urge to use it?

29 A I think it's just a word
 30 that's heaved around, as you say, I would not list my profession as

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 an environmentalist. It's a term that's been hoisted
2 upon me; I'm a plant ecologist.

MR. SCOTT:

3 Q But I take it that all
4 members of the panel understood that the expression
5 "environmentalist" in this context meant someone who
6 had special knowledge or training in some biological
7 science.

8 A I have responded with
9 that understanding, yes.

10 Q There's no doubt about
11 that, I take it. Well now, the last --

12 THE COMMISSIONER: Excuse me,
13 in the University of Calgary, if I can just find out
14 a little more about this, do you graduate with a
15 degree in environmental design which could be anything
16 presumably from architecture to --

17 A At the University of
18 Calgary it's a Faculty of Environmental Design, it's
19 my understanding. There are departments within it,
20 some of which are primarily concerned with urban
21 planning architecture, and one of which at least,
22 and there is one which concentrates more or less on
23 the environment, and includes people who have expertise
24 in biological sciences, so that these are departments
25 within an overall faculty.

26 THE COMMISSIONER: All right,
27 well carry on.

28 MR. SCOTT: Now the last
29 principle that I'd like to put to you is this.

30 Q Where disturbance has

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 taken place, and as a guard against future disturbance,
2 stabilization, restoration and/or rehabilitation
3 measures must be implemented.

4 A Yes, that's correct, yes.

5 Q Now, Mr. Hemstock, for
6 the panel would those be the principles against which
7 you have attempted to assess the project? Or are
8 there others?

WITNESS HEMSTOCK:

9 A I think that that's a
10 pretty good summary of the principles. We have looked
11 at ^{it} a slightly different way, as we have in the appli-
12 cation, and -- but I think we arrive at -- in fact I
13 think yours is an extremely good summary of the
14 approach.

15 Q Well, what I'm really
16 getting at here is when -- and I hesitate to use the
17 word "environmentalist" again -- but when someone
18 with biological skills or training approaches this
19 particular project to examine it, would that be the
20 backdrop of principles that would guide you in making
21 your assessment of it?

22 A Yes.

23 Q Dr. McCart?

24 WITNESS McCART: Yes, Mr. Scott.

25 Q Any ones you want to
26 add to it?

27 A Well, if I had some
28 time to think about it I might want to add something,
29 but at the moment nothing springs to mind.

30 Q Well now, just one other

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 sort of quasi philosophical question, all the evidence
2 that we've heard has compared the Mackenzie Valley and
3 the delta and other parts of the Territory as they
4 now exist with the delta and the valley as it will
5 exist after the pipeline has been constructed, and
6 the rehabilitative or restorative measures have been
7 taken. In other words, we, as I understand the evidence,
8 we have heard statements about how the applicant pro-
9 poses to restore or maintain what was there before.
10 What I want to ask you is, have any of you considered
11 the project in terms of rehabilitation in a broader
12 sense, that is improving the situation that was there
13 before? Or is that something that is outside your
14 terms of reference?

15 WITNESS DABBS: For my own
16 part I would say that I have never seen a situation
17 where mankind has been able to improve upon nature,
18 so I've not ever taken that position in assessing the
19 impact of this project.

20 Q Well, apart from that,
21 what I'm concerned about is that it seems to me that
22 if you were concerned only with restoration, you would
23 be concerned with putting back as closely as you could
24 what was there before the pipeline was built. If you
25 were concerned with rehabilitation in a broader sense,
26 you might be considering taking steps to improve the
27 flow of rivers, or to improve the terrain, or -- of
28 some type, but I'm simply asking whether those things
29 are within your terms of reference or without?

30 A They have never been

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 within my terms of reference dealing with your first
2 point of restoration. There are certain practical
3 limitations, and I don't believe a plant community can
4 be rebuilt and certain steps as outlined can be under-
5 taken to assist nature in its own mending processes.
6 That's the best, I think, that can be achieved.

7 QMr. Hemstock?

8 WITNESS HEMSTOCK: Yes, I
9 would agree with that in general. Obviously there are
10 some things that you do that may in fact, I suppose,
11 improve the situation for a species, perhaps, but this
12 is to me sort of an artificial situation and I don't
13 think that you would -- I think that the goal ought to
14 be to get as close back as possible to the original
15 situation. Dr. Banfield has, for instance, pointed
16 out that -- the fact that there is a clearing provides
17 what he calls an edge effect, and for certain species
18 this may be an advantage; but I don't think that that's
19 the kind of thing that you're speaking about.

20 Q I'm dealing with this
21 example, for example. We've heard that efforts will be
22 made to assure stable slopes. Now we all know that there
23 are lots of unstable slopes in the Mackenzie Valley that
24 are going to erode whether there's a pipeline or not.
25 What I'm concerned about is, has your focus been merely
26 to prevent the erosion of unstable slopes insofar as
27 the pipeline is concerned, or do you regard yourselves
28 as having any more general responsibility than that?

29 A No, we would restrict
30 our concerns to the pipeline and the associated require-

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 ments.

2 Q Dr. McCart?

3 WITNESS McCart: Our major
4 aim is to ensure as far as possible the status quo
5 is maintained as far as the population of aquatic
6 organisms^{goes.} I should point out, however, that we do
7 take note of any situation where there seems to have
8 been improvement, or could be an improvement as a result
9 of our activities,ⁱⁿ a situation with respect to fish
10 populations.

11 Q Are you thinking of
12 re-stocking, for example?

13 A Well, we've considered
14 that as a possibility. It's something that one bears
15 in mind.

16 Q Well, on that subject
17 let me ask you if that kind of thing has been regarded
18 by you as being within your terms of reference on
19 this project?

20 A Yes, I think re-stocking
21 is something we have considered as a possibility in
22 some instances.

23 Q Is it -- I take it that
24 it's re-stocking to restore rather than re-stocking
25 to improve.

26 A Re-stocking to restore,
27 yes. We would also incidentally make some recommenda-
28 tions, I think, in passing, as to regulations that
29 might be in force in certain areas to protect or
30 improve the situation for populations which might

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
~~Cross-Exam~~ by Scott

1 in fact be detrimentally affected at this point.

2 Q Well now, one other less
3 general question before we get into the main things
4 I want to ask you about, and it relates to Mr. Hemstock's
5 evidence, I think at the top of page 10, and Mr. Hem-
6 stock, I think it was read in your absence for you, and
7 you say:

8 "Land required for the right-of-way will not
9 be pre-empted for exclusive pipeline use as
10 trapping, hunting, etc., can carry on over
11 the right-of-way."

12 Now I take it that the implication behind those words
13 is that the pipeline will require only an easement or
14 right-of-way which will be buried, and that apart from
15 compressor stations, uses such as trapping-hunting,
16 etc., will or may be carried on without hindrance
17 after it is built and constructed.

18 WITNESS HEMSTOCK: Yes, that's
19 like in the south farming is carried on over the
20 pipeline right-of-way.

21 Q The thing that troubles
22 me about it is that implicit in that statement is
23 the observation that the use of terrain will not be
24 affected by the presence of the pipeline. Now what
25 I want to put to you is this proposition. It has
26 become part of the conventional wisdom here that the
27 laying of this pipeline over -- and the period over
28 the next decade or so will provoke development of other
29 oil and gas reserves in the valley and bring substan-
30 tial numbers of people to the Mackenzie Valley. I'm not

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 blaming Arctic Gas for that, but I'm simply saying
2 that that is regarded as axiomatic, and I take it you
3 wouldn't disagree.

4 A Yes, I think that's
5 true.

6 Q Well, to what extent is
7 it then correct to say that the use of the terrain
8 that is the right-of-way will not be impeded? For
9 example, if a white settler or a native corporation,
10 if there be one, decided they wanted a quarry or a
11 native corporation, if there be one, decides they
12 want a quarry on lands to the east of the pipeline,
13 and build a road bringing their quarried material
14 across the pipeline to the river, what will -- to
15 what extent will that use be permitted?

16 A Well, subject to Mr.
17 Williams on this, I would see no difficulty whatsoever.
18 It's standard practice, of course, for a pipeline to
19 pass under railways, highways, roadways, and if roads
20 are required across the pipeline right-of-way, such
21 provision can be made. Normally it requires, I would
22 think, a casing around the pipeline and a properly
23 designed grade for the crossing.

24 Q Well, isn't it correct
25 to say that while after the pipeline is built it may
26 be possible to hunt and fish over the right-of-way,
27 that if the Territory develops, there will have to
28 be develop^{ed}/restrictions as to how the right-of-way
29 can be used in terms of roadways, passageways, the
30 passage of trucks and all the rest of it?

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 A Yes, there will be
2 restrictions which would preclude some activities on
3 the pipeline right-of-way. For instance, mining would
4 be precluded.

5 Q Well, I take it not
6 only mining, but Arctic Gas will not, without regula-
7 tion, be prepared to permit anybody to build a road
8 across the pipeline right-of-way.

9 A The crossing would have
10 to be properly designed, yes.

11 Q Not only that, but I take
12 it that it could not be done without the concurrence
13 of Arctic Gas who own the pipeline.

14 MR. MARSHALL: Well, Mr.
15 Scott, as you know, it's a question of law. The
16 N.E.B. regulates such matters.

17 MR. HOLLINGWORTH: I was just
18 about to say it's a matter for N.E.B.

19 MR. SCOTT: Well, that may be
20 so, but I'm simply -- I'm desirous of qualifying what
21 I took to be a very general statement that uses could
22 continue unimpeded, and Mr. Hemstock, you will agree
23 with me that apart from the hunting and trapping use,
24 any other uses will have to be regulated, either by the
25 appropriate agency, or by the owner of the right-of-
26 way, Arctic Gas.

27 A I would think that there
28 are several other uses which could be made, and I'd
29 have to think about this. For instance, farming could
30 be carried on.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
CrossExam by Scott

1
2 Q Without the permission
3 of Arctic Gas?

4 A I would think that that
5 would be -- could be incorporated into the permit, yes.
6 Grazing of cattle, those kind of things which use only
7 the surface would seem to me to be quite acceptable
8 and could be carried on without any harm to the pipeline.

9 Q Well, when a gas company
10 enters into an agreement with a landowner, farmer in
11 Southern Canada, to allow a pipeline to cross his farm,
12 a buried pipeline, let us say, to cross his farm, they
13 enter into an agreement with the farmer. Isn't that
14 correct?

15 A Yes.

16 Q And that agreement
17 stipulates in considerable detail the limitation on
18 use that will attach to the owner of the land, the
19 farmer.

20 A I'm sorry, I don't know
21 what typical agreements would cover.

22 Q Well, Mr. Williams,
23 that's so, isn't it?

24 MR. MARSHALL: Well, it's a
25 question of law again and I think Mr. Hollingworth
26 could probably coach you on this, Mr. Scott. It may
27 be a matter that's negotiated between the parties;
28 it may be a matter that is dealt with in Alberta by
29 a government agency; but in effect it expropriates
30 a right-of-way and it will determine the terms and

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 conditions. Here we're dealing with something under
2 the jurisdiction of the National Energy Board and
3 you're as familiar with that as the panel are.

4 MR. SCOTT: Well, the point I
5 simply want to make is that apart from hunting and
6 fishing, and perhaps one or two other absolutely surface
7 rights, the use of the pipeline right-of-way will in
8 fact be substantially regulated by either Arctic Gas
9 or other agencies, and therefore the use will to that
10 extent be restricted.

11 MR. MARSHALL: It's not an
12 answerable question, including walking and skidooing?

13 MR. SCOTT: I don't think the
14 question was unclear. What was the difficulty about
15 the question? Apart from certain superficial uses,
16 such as hunting, fishing, walking and farming, any
17 other uses will be precluded or permitted, either by
18 the owner or by regulation.

19 MR. MARSHALL: It's a function
20 of what's in the permit. If the permit spells out
21 that there are certain uses, surely those uses are
22 allowed, Mr. Scott. We're not at that point yet.

23 MR. SCOTT: All right.

24 MR. MARSHALL: It's a question
25 of what's negotiated or what's legislated or dictated
26 by the proper authority.

27 MR. SCOTT: Well then, I take
28 it it's obvious that Arctic Gas would not want the
29 people who live here to conclude that their use of
30 this land can continue unimpeded after the pipeline

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 has been built. Isn't that fair?

2 MR. MARSHALL: Could you
3 specify what use you're talking about?

4 MR. SCOTT: Any use apart
5 from hunting, fishing, trapping, and walking.

6 WITNESS WILLIAMS: I would
7 certainly take exception to the word "precluded", Mr.
8 Scott. Crossings of the pipeline can be done if the
9 necessary precautions are taken. Now this might slow
10 up some activity, but it certainly wouldn't preclude
11 it.

12 MR. SCOTT: Well, let's take
13 my example. If I decide on my own land, on the east
14 side of the pipeline to quarry for some mine, and I
15 want to load trucks and drive them directly to the
16 river, I won't be able to do that without either the
17 approval of Arctic Gas or the National Energy Board.

18 A Right.

19 Q And I take it that that
20 is so for a whole range of activities that may require
21 crossing or re-crossing the pipeline.

22 A Yes, and that doesn't
23 mean that it can't be done; it just means that you
24 have to go through the processes and do it properly.

25 Q And in that -- and I am
26 sure you are not ashamed to say this is accurate -- in
27 that, in the resolution of the rights to cross and
28 re-cross, the integrity of the pipeline must come first.

29 A That sounds reasonable,
30 yes.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Examination by Scott

1 Q And there is no doubt
2 that this pipeline route is -- will form, to that
3 extent, a barrier between the bulk of the Northwest
4 Territories and the river in the sense that it sub-
5 stantially parallels the river.

6 MR. MARSHALL: Well, Mr.
7 Scott, could you be specific? . A barrier from what?

8 MR. SCOTT: For passage of the
9 type I've described without the permission of the
10 regulatory agency or the owner of the right-of-way.

11 MR. MARSHALL: Well, if there
12 is one quarrying operation that fits into the example
13 which you gave, and we're talking about a right-of-way
14 through the whole of the Territories --

15 MR. SCOTT: Mr. Commissioner,
16 the point there --

17 MR. MARSHALL: Nobody disagrees
18 with you, Mr. Scott, that in certain circumstances
19 if there are some activities that people want to
20 carry on that involve crossing the right-of-way with
21 certain types of equipment and so on, that arrangements
22 will have to be made. We accept that. Nobody argues
23 about it.

24 WITNESS HEMSTOCK: I presume
25 with that argument that the Interprovincial Pipeline
26 and the TransCanada Pipeline, the Alberta Gas Trunk
27 have divided Southern Canada into completely isolated
28 sections.

29 MR. SCOTT: Well --

30 A I don't think that this

Clark, Dabbs, Harlan, Hemstoc
McCart, Minning, Williams
Cross-Exam by Scott

1 is a fact.

2 MR. SCOTT: --I wouldn't have
3 raised the matter at all except that the statement in
4 the transcribed evidence indicates that land used for
5 the pipeline will not be pre-empted from other main
6 uses -- trapping, hunting and fishing. Now I take it
7 that subject to negotiation and arrangement, it will
8 be pre-empted for a substantial range of other uses.
9 Isn't that so?

10 MR. MARSHALL: I object to the
11 question.

12 MR. SCOTT: Well, Mr. Commis-
13 sioner, the point of it is this, and it seems to me
14 this is a point of some substance, we have all agreed
15 that over the next decade or two, there will be a
16 substantial influx of development and people into the
17 Territory and many of them will not come here to hunt,
18 fish and trap. We're concerned on this panel with ter-
19 rain use, and the observation I have made and which
20 I would have thought was relatively clear is that
21 the existence of this pipeline will impose a substantial
22 restriction on movement from one side of it to the
23 other, as the population and industry of the Territory
24 develops because arrangements for that movement will
25 have to be made either with the owner of the right-
26 of-way, or with the regulatory agency.

27 MR. MARSHALL: Surely, sir,
28 that's an argument.
29
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Clark, Dabbs Parlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

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MR. MARSHALL: Let me just-- if
it is going to have substantial barrier effect like Mr.
Scott is suggesting, perhaps he wants to lead some
evidence on that and put it in argument. What he is
putting forward now is simply an argument.

MR. SCOTT: Well I take it Mr.
Commissioner that Mr. Marshall agrees with the fact on
which that argument is based; that apart from certain
superficial rights to hunt, trap, fish, walk, any other
rights to cross and recross or use, will be governed by
arrangement with the pipeline company or via the Energy
Board.

MR. MARSHALL:
Mr Scott's statement is a
pretty straight forward one, I thought. It says that "land
required at the right-of-way will not be preempted for
exclusive pipeline uses. Trapping, hunting etc. can
carry on over the right of way." So all it is saying that
simply because you have a pipeline there doesn't mean
that other things can't happen over the same land.

MR. SCOTT:
Well, Mr. Commissioner, I don't want
to pursue it indefinitely but does Mr. Marshall agree that
apart from the uses which he has conceded in the canned
evidence can be carried on and uses of that type, that
all other uses of the land will have to be made by
arrangement with Arctic Gas or through the agency of the
Energy Board.

MR. HOLLINGWORTH: Well I agree
with Mr. Marshall sir. It seems to me that Mr. Scott by
innuendo is raising a whole variety of activities that

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McCart, Minning, Williams.
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can no longer be carried on over a pipeline right of way,
the crossing by vehicles.
so so far he has raised one, / He has raised no more
activities that might be affected and by innuendo I think
he is trying to insinuate that there is an iron curtain
that is going to defend, that is going to cut the
Territories in two.

MR. SCOTT: Precisely.

MR. HOLLINGWORTH: I think you
have to be more specific as to what activities he is
concerned about.

MR. SCOTT: I am concerned Mr.
Commissioner. That is the precise concern that the
existence of the pipeline apart from hunting, trapping and
fishing will impose, and maybe in the public interest to
do it, but will impose a kind of iron curtain that will
mean that uses of land on the east side which require
transportation to the west side can only be carried on
with the approval of Arctic Gas or with the approval
of the Energy Board.

MR. MARSHALL: Well Mr. Scott
that again, I am repetitious, is in large measure a
function of what the grant of an easement says. The
grant of an easement may make provision for various types
of activities or it may not. We are not at the point yet
of knowing what is going to be in that. If you wish to
make representations to the Inquiry that an easement ought
to have certain limitations or make provisions for
certain types of activities, I would be delighted to join
issue with you on it but we are anticipating something that

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we don't, we don't have any concrete information on.

MR. SCOTT: Well let me ask this question. Perhaps it is for Mr. Marshall to be answered later by some other panel. To what extent is Arctic Gas prepared to provide roads at regular intervals, if they be required, to assure that logging, mining and other persons of that type who use land to the east will be able to cross it?

MR. COMMISSIONER: This is a slightly different question. The first issue, it seems to me, is one that raises questions of argument that can be addressed to the Inquiry when we reach the time for argument. I don't think that anyone would say that there will be unrestricted use of the land that is set aside for right-of-way purposes. It is obvious there will be some restrictions. Whether they are substantial or not is another matter. The question you come to now, Mr. Scott, is one that is really a matter of policy that Arctic Gas, through Mr. Marshall or through the recall of Mr. Horte might be able to answer.

MR. SCOTT: Well the --

MR. COMMISSIONER: Excuse me.

MR. SCOTT: I am sorry --

MR. COMMISSIONER: And that is well, are you willing to pay for and build appropriate roads and crossings of the right-of-way for mining, lumbering and other uses and that's, I don't think this panel is going to be able to answer this.

MR. SCOTT: Well, Mr. Commissioner

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I don't require the answer now. I simply raise it because what we are concerned about here is terrain impacts and the panel has been very forceful in its canned evidence in asserting that the terrain impact is to, is restricted to a single strip of land that runs from north to south. That is not the whole story of terrain impacts because if the terrain impacts have the effect of preventing the economic use of the land to the east, because transportation is either difficult or expensive or impossible. that is a substantial terrain impact.

MR. MARSHALL: Sir, perhaps I can help a little bit, maybe not. I am thinking maybe Mr. Hollingworth's clients could help by giving Mr. Scott a tour but there are large diameter high pressure gas pipe lines criss-crossing North America. Farming and ranching can go on over these. They are crossed many times by railroads, by highways by all sorts of roads. North America and the world is going to live with the existence of pipelines in settled areas and arrangements are negotiated for crossing of these things. Sure you can't take a back hoe and dig a trench across a pipeline easement or your going to have a disaster. You will break the pipe and gas will escape. It is the same with underground electric wiring and telephone cables and so on but the policy question that you have raised, I suppose it is one that a witness could speak to, whether or not Arctic Gas is prepared as a matter of policy to provide certain types of crossings at specified locations and I will certainly discuss this with the client but I

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don't know that we can go beyond that point.

MR. SCOTT: Well when doing that perhaps you would let us have a sample of an easement agreement that is standard to one of your participants between let us say a farmer in southern Canada and the pipeline company. So we can see what kind of restrictions are going to be imposed on the use of the land.

MR. MARSHALL: I am sure I have got a precedent in my office that I can give you Mr. Scott.

MR. SCOTT: I simply flag that, Mr. Commissioner, because I think it is an important issue relating to terrain use and if Mr. Marshall responds to it at some later stage in the way he suggests I will be content. Well now let me see if I can, if I can deal with another range of what I regard atleast as important matters. We have heard in phase one about how the pipeline is going to be constructed and about the steps that will be taken to ameliorate or modify the potential adverse enviromental impacts. We have heard about erosion techniques and various design solutions to a range of problems and we have been assured vigorously by the panels that these design solutions will work and will modify the problem to which they are directed. Now I would like to approach it a little differently. Let us assume that they ~~don't~~ work in any given instance. What I would like each of you to do for a particular area that I will ask you to concentrate on is list the enviromental impacts that will occur or to which your solutions are

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directed and to list them in order of some priority, what are the important ones and what are the unimportant ones. Now I say that and it is rather a long preamble to a question but I say it conscious to the fact that time is an important element in construction of a pipeline and money is an important element and when I see X million dollars being spent on erosion control and Y million dollars being spent on the revegetation and smoothing out of gravel pits, I begin to wonder about how the priorities are selected in terms of where you place your money and your effort and your time. Well now first of all with that exercise in mind can we -- First of all Dr.'s Harlan and Clark, can we look at the issue of the chilled pipeline in terrain terms. We have heard a lot about it in the engineering evidence about the effects of surface and sub-surface drainage. frost heave and so on and what I would like to ask you to do is to measure the environmental impacts of your failure to solve that problem.

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 MR. MARSHALL: Mr. Scott,
2 I would like you to be more specific. Can you take a
3 particular terrain, a particular location?

4 MR. SCOTT: Well, let me --

5 MR. MARSHALL: That's something
6 that is extremely general and I don't know how the
7 witness could ever respond to it.

8 MR. SCOTT: Let me put this
9 proposition, Mr. Commissioner. If this pipeline is
10 built and if the panels that we've heard on engineer-
11 ing matters are right, everybody will be happy and
12 there will be no complaints. But I have a sneaking
13 suspicion that, as it always happens in the affairs of
14 men, that everything will not go right. It never does.
15 and that some environmentalists five years from now
16 will be complaining. I want to know what they're going
17 to be complaining about. It seems to me if we can
18 isolate that, then we can decide what the important
19 things to concentrate on are.

20 MR. MARSHALL: Well, surely
21 Mr. Scott, if that's your concern you should call some
22 evidence about it.

23 MR. SCOTT: Well, I may or
24 may not, but I think I'm entitled, Mr. Commissioner,
25 to have the view of this panel in their specific
26 areas as to the impacts that may occur if the design
27 solutions are not satisfactory, and the way they rank
28 those impacts in terms of priority.

29 MR. MARSHALL: I object to the
30 question, sir. It's so general we could be here for

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 years, in trying to come up with an answer to that.

2 MR. SCOTT: Well, I'll under-
3 take not to take more than two hours. That allows me
4 some time.

5 MR. MARSHALL: I think it
6 would take the witnesses much more than two hours
7 simply to analyze all of the various factors for all
8 the various type situations that they've been consider-
9 ing over the last six years in order to be able to
10 come up with some sort of a ranking as you want them
11 to. I think it's a really impossible undertaking,
12 Mr. Scott.

13 MR. SCOTT: Well, Mr.
14 Commissioner, an example would be -- and I don't want
15 guaranteed judgments, no one asks that -- is frost
16 heave regarded as a more serious problem over the
17 pipeline length than, what's the opposite?

18 MR. MARSHALL: Thaw settlement.

19 MR. SCOTT: Thaw settlement.

20 MR. MARSHALL: I have no
21 objection to Dr. Clark answering that question

22 MR. SCOTT: Well, what I am
23 asking is to list with respect to the impact of the
24 chilled pipeline the consequences of failure and the
25 priority in terms of impact which is attached to that.

26 THE COMMISSIONER : Well, Mr.
27 Marshall, I'm against you. I think the questions are
28 appropriate, because the whole object of the exercise
29 as far as Arctic Gas and Foothills are concerned has
30 been to take measures against anticipated problems. If

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Cross-Exam by Scott

1 the measures they propose to take fail, what will
2 occur? What is the magnitude of the problem that
3 they foresaw, and now feel they can protect us and the
4 north against? I don't see any difficulty with that.

5 MR. MARSHALL: If the
6 witnesses can use certain specific examples, you know,
7 we're looking at a very long pipeline and a great
8 variety of circumstances and if the witnesses can
9 respond to Mr. Scott's question by developing responses
10 that pertain to particular fact situations. --

11 THE COMMISSIONER: Well, frost
12 heave is in the way a good example because we all have
13 some idea of what would occur if the measures Arctic
14 Gas proposes to take were to fail.

15 MR. SCOTT: Mr. Commissioner,
16 I don't ask for any terribly specific analysis, but
17 for example, and I only with hesitation adopt an
18 example in Dr. McCart's field because he may disagree
19 with me, but if I were a fish biologist, I think I
20 would say, looking at this project, "I hear there
21 are three or four things that can happen; there can
22 be excessive siltation, there can be a cutting off
23 of water courses or what have you." I judge with regard
24 to this program that there are ^{these} four potential consequences if design solutions don't work, and I think the
25 most important of them, the most important risk we run
26 is A rather than B. It's a value judgment, but it's
27 surely the kind of value judgment that every engineer
28 and environmentalist has to make in deciding where to
29 put his money, and I'm sure that's been done by Arctic
30

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1 Gas.

2 MR. MARSHALL: Well, I think
3 in the example that you've given, yes it has.

4 THE COMMISSIONER: What did
5 you say the most important risk was? I missed that.

6 MR. SCOTT: Well Dr. Clark will
7 probably cringe when he hears this, but
8 it gets back to Dr. Casagrande, but / ^{when you have} limited resources
9 and limited time, you zero in on, you list the risks,
10 and you establish priorities. Now I'm sure that's been
11 done. I would simply like to know what the risks are
12 in the series of given areas and what the panel regards
13 as the most important risks to which they have devoted
14 their maximum attention and effort in attempting to
15 provide solutions.

16 THE COMMISSIONER : Well, we're
17 going to adjourn in a minute for lunch, but I should
18 say that I think the line of questioning is appropriate.
19 The environmental impact of / ^{the} pipeline is something
20 that this Inquiry is bound to examine and it's never
21 been done before in this country in this way, and I
22 see no reason why I should hear only what the remedial
23 measures are that are ~~proposed~~ to be taken, and not hear
24 about the risks that gave rise to the necessity for
25 those measures, and to hear something about the importance
26 that these ladies and gentlemen who are offered to us,
27 and we accept them as people of high professional
28 competence, have to say about it. I don't think we're
29 doing an injustice to Arctic Gas or N.E.S. or Foothills,
30

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Cross-Exam by Scott

1 or anybody else in saying that we'd like to hear
2 about the consequences of failure, because those are
3 what Arctic Gas and Foothills are spending their money
4 to guard against.

5 MR. SCOTT: Mr. Commissioner,
6 Dr. Fyles has pointed out that I may have triggered
7 Mr. Marshall's reaction by using that expression,
8 "the consequence of failure ", when what I should
9 really have said is what are the kinds of -- what are
10 the things you're trying to guard against happening?

11 MR. MARSHALL: Well, I have no
12 difficulty with it as modified by my friend, sir. It
13 was doing really an impact assessment, if you like,
14 for the whole of the line because as Mr. Scott is
15 hypothesising all of the mitigating measures fail, and
16 what are the consequences then? The panel members,
17 I'm sure, can deal with what the factors are that they
18 are attempting to guard against.

19 THE COMMISSIONER: Well, let
20 me put it this way. Suppose Mr. Wilder and Mr.
21 Horte and Mr. Blair came into the offices of these
22 men five years ago and said, and conceivably they would
23 have come together in those days.

24 MR. HOLLINGWORTH: Mr. Wilder
25 wasn't around then.

26 THE COMMISSIONER: And they said,
27 "Look, we want to build a pipeline from the Arctic to
28 the Alberta border and we want to have it 48-inch
29 pipeline, we want the amount of volumes to be such and
30 such on a daily basis, ^{about} 1/2 billion, whatever it is,"

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Cross-Exam by Scott

1 so these people would presumably within a week say to
2 them, "Well, look, these are the problems. This is
3 what will happen if you just go ahead and build it,
4 dig a trench and throw some dirt in when you've laid the
5 pipe and leave. These are the things that will happen,
6 so have you got the kind of money that we're going to
7 need to make sure ^{that} they don't happen?"

8 MR. SCOTT: The reason, Mr.
9 Commissioner, that I think priorities are important
10 is, frankly it stunned me to hear what was going to
11 be done to the gravel pits, not that I don't approve
12 of it, I think it's a marvellous thing, but they're
13 going to be rounded out and re-vegetated, but bearing
14 in mind that may cost many millions of dollars, I
15 wonder if that's really the place -- and maybe it
16 is -- where the millions of dollars should be spent.
17 That will certainly improve the view for P.W.A.
18 passengers flying to Inuvik but I'm not sure what
19 other concrete and useful effects that will be had and
20 maybe it will be that the panel thinks that efforts
21 should be concentrated on erosion control rather
22 than rehabilitating gravel pits, and I'd just like if
23 we could / in general terms, a ranking of the risks and the
24 priorities that this panel has applied.

25 THE COMMISSIONER: By the way,
26 Miss Minning, a couple of months ago I visited the
27 Hire North Camp, the main camp, which is, I think,
28 south of the River Between Two Mountains or the Willow-
29 lake River, I've forgotten which; but they took me to
30 see two gravel pits and one had been restored, squared

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1 off, the pit squared off and so ^{on.} / If you have seen those
2 pits and they're on the highway, nothing to do with
3 pipelines, but if you've seen them you might tell me
4 whether that's the sort of restoration that Arctic
5 Gas has in mind. If you haven't seen them, don't say
6 anything about them.

7 WITNESS MINNING: I'm not sure
8 exactly which pits you mean. Yes, in that area they
9 have been restored in a better manner than the pits
10 that I showed you. Just south of Fort Simpson has not
11 been restored, and the bottom of the pit was all
12 bumpy, I don't know if you remember that, and it was,
13 I think, done in days before the highway was thought
14 much about.

15 Q Yes.

16 A That sort of thing. Now
17 as far as re-vegetating the gravel pits and this sort
18 of thing, I think it is planned to prevent -- I
19 don't know if you've ever been to Calgary and seen
20 the terrace of the Bow River which has never re-
21 vegetated, it never had much work done on it until
22 just recently and I think that's the sort of thing
23 we're trying to prevent, in doing the borrow pits the
24 way we are. It's not a very nice sight.

25 MR. SCOTT: I am in no way
26 being critical of you doing it, I think it's an
27 absolutely superb thing; but when Dr. Clark comes to
28 prepare his budget it would seem to me that he'd say,
29 "Well, in environmental terms is that more or less
30 important than putting some money into erosion, or

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Cross-Exam by Scott

1 water migration or drainage," and that's really the
2 kind of analysis I would like the panel to make after lunch

3 THE COMMISSIONER: Right.

4 You're suggesting Dr. Clark might opt for traditional
5 engineering concerns rather than environmental.

6 MR. SCOTT: No, but I think Dr.
7 Clark might say that the -- with the assistance of
8 others, as he hasn't pretended to be an environmental-
9 ist - - that the dangers of erosion are more important,
10 not only to the pipe but to the environment, than the
11 dangers that someone will be offended by the sight
12 of an unrestored gravel pit, and that therefore he
13 would like to concentrate his efforts on problem A
14 rather than problem B. That's an extreme example,
15 obviously, but I think it may not be.

16 THE COMMISSIONER: O.K. Well
17 can we deal with that after lunch?

18 (PROCEEDINGS ADJOURNED TO 2 P.M.)
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Clark, Dabbs, Harlan, Hemstock
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT: Q Mr. Hemstock,
could we just go back to something we were dealing
with, the Sunday Tribune case involving the pipeline
on pipeline lands. The point I was simply making and
I presume that we're not far apart, if at all, is
that certain uses of the pipeline right-of-way
will have to be regulated by arrangement either with
Arctic Gas or via the National Energy Board.

WITNESS HEMSTOCK: A Yes,
that is correct.

Q Yes, and I take it that in
the south for example, when someone wishes to build a
roadway across the pipeline, the general procedure is
that he must, or he should file a plan of his proposal
where upon an assessment is made as to whether extra
shoring or whatever is required before the work is done.

A I am not aware of the law
and I think that that would be a proper approach to
it, yes.

Q And, however the cost of
this may be assessed, there is no doubt that these
are costs that are attributable to the existence of
the pipeline and its right-of-way?

A Yes.

Q Yes. Well now, I didn't
want to suggest--perhaps, I was too aggressive and
over-eager--I didn't want to suggest that I oppose
regulation or arrangements between the pipeline

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2 companies and other users. I was simply trying to
3 emphasize the point that there must be such regulations
4 Now, I don't know whether you're familiar with Mr.
5 Owen's report on the Pointed Mountain Pipeline.

6 A I have read it, but it
7 has been a long time ago.

8 Q In general.

9 A Yes.

10 Q He gave evidence here
11 and I unfortunately missed it but I've read his
12 report and I understand the gist of his evidence,
13 whether it is right or wrong, to be that after the
14 construction of that pipeline, seismic crews, with or
15 without permission, entered upon the right-of-way at
16 various places and crossed it and in the act of so
17 doing occasionally dug up earth from the right-of-way
18 to make crossing ramps and various things.

19 Now, and I think Mr.
20 Hollingworth in cross-examination made the point
21 that that was a regulatory matter that the N.E.R.
22 should have seen didn't happen. Now, I take it that
23 it is agreed that someone must assume responsibility
24 to see that that doesn't happen on this pipeline.

25 MR. MARSHALL: Can this witness
26 speak to that? You are talking about a matter of
27 government's responsibility, are you not?

28 Q No, we're not. We are
29 talking about as in the Pointed Mountain Pipeline
30 and the case in which the elaborate restorative measures

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Cross-Exam by Scott

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2 that were taken by the pipeline company were damaged
3 or hindered because strangers used the right-of-way
4 in such a fashion that they damaged the restorative
5 measure. I take it Mr. Hemstock, you can conceive
6 of that happening.

7 A Yes.

8 Q Yes. A seismic crew
9 could come in and in a year or two and dig up all Mr.
10 Dabb's plants in a certain location?

11 MR. MARSHALL: They would do
12 so at their peril.

13 MR. FOLLINGWORTH: That is
14 a lot of digging. He has a lot of plants.

15 MR. SCOTT: I hope Mr. Dabbs
16 will have passed on to some other project by that
17 time.

18 I take it that you would
19 agree with me that it is a matter of terrain usage and
20 environmental usage that whoever has the responsibility
21 that sort of thing must be / controlled and regulated.

22 A Yes.

23 Q Now, what I'm really
24 asking Arctic Gas is, has it any plans for that kind
25 of regulation of the right-of-way's use?

26 MR. MARSHALL: I'm sorry, Mr.
27 Scott. You mean a policing? Is that what you are
28 getting at?

29 MR. SCOTT: Well, I wouldn't
30 characterize it one way or the other but has Arctic

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1 Gas any plans to see to it that within the five or
2 six years after the pipeline is built and constructed,
3 strangers do not use it in such a way that it will be
4 damaged?
5

6 WITNESS HEMSTOCK: A Well, as
7 part of the normal operation and maintenance of the
8 pipeline, there would be routine surveillance flights
9 along the pipeline route and one of the greatest
10 concerns in the south has to do with the activities
11 of others approaching or encroaching onto the pipeline
12 right-of-way and perhaps damaging the pipeline. So
13 that that would be one of the things that would be
14 monitored during the surveillance flight. Now it's
15 quite conceivable that between the flights there would
16 be activities which we were unaware of that would
17 surround the pipeline right-of-way but these would
18 be picked up as regularly as the flights are made,
19 which I understand are in the order of perhaps once
20 every couple of weeks.

21 Q I'm not at all concerned
22 that your flights will be conceived as spying trips
23 on anybody. I'm not at all concerned about that. I'm
24 absolutely confident that surveillance will be done
25 to assure the integrity of the pipe. What I am
26 concerned about is whether you agree with me that it
27 is desirable that some kind of surveillance be done
28 to ensure the integrity of the environmental remedies
29 and considerations that this panel and others have
30 discussed.

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2 A Those are part of the
3 inspection flights.

4 Q Yes. Is there a plan that
5 we can look at or is there any outline of a plan as to
6 how this kind of inspection and control of the pipeline
7 right-of-way is going to be carried out.

8 A So far as I am aware, that
9 is not set up any place as a separate document but
10 we have alluded to it in the application where we have
11 pointed out that one of the most important parts of the
12 surveillance is the monitoring and the checking on the
13 environmental factors which occur on and around the
14 pipeline. These things are listed or documented in
15 the statement.

16 Q Let me see if I understand
17 by a practical example. Supposing it comes to your
18 attention that--and I am asking you what the situation
19 is now, not what it should be--but supposing it comes
20 to your attention that some seismic crew has wandered
21 on and has used the route as a roadway, which is not
22 inconcievable and has dug up earth along it for its own
23 purposes. Now, I take it first of all, you would find
24 that objectionable in that it might endanger the
25 environment that you have spent a lot of money to
26 protect.

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1 A We would also expect it to
2 be quite enlightening because the seismic operators
3 are quite required to get a land use permit from the
4 government.

5 Q Yes.

6 A And surely the government
7 with have a map of the pipeline and will be aware of
8 any problems of crossing. Now I can't foresee...

9 Q What I am asking you is in
10 the present situation, is it simply this, that if that
11 happens at the moment on a pipeline of yours, really what
12 you have to do is complain to government? You have no
13 powers or abilities or capacities to do anything else?

14 A I really don't know what
15 the law is in that case.

16 MR. MARSHALL: It is a question
17 of law isn't it, as to what remedies the holder of an
18 easement has when there is a trespass in the easement?

19 Q All right let me take it a
20 slightly different way. Can you give us in any detail
21 your plans for surveillance, not ^{with} respect to the in-
22 tegrity of the pipe but with respect to the integrity of
23 the enviroment on the right of way?

24 A Well, I thought that I had
25 done that. The major of enviromental surveillance will
26 be as a result of the routine inspection by air and the,
27 obviously if any difficulty is seen. say at a river
28 crossing or so on it may include in addition to that a
29 land base inspection.

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Q Yes I see. Have you any
knowledge at the present time at what interval these
inspections will occur after the pipeline is fully
constructed and operative?

A We have stated in the report,
as I recall, that it is in the order of once every two
weeks and I think we also pointed out that it will vary
according to what we think are the more serious times of
year. We said that in the spring when the spring runoff
is occurring that that is probably a more difficult time
and we may need to make those routine flights more
numerous.

Q Yes. And as to your right
or whatever to control or regulate persons that will be
a matter for your lawyers and not for you?

A Certainly not for me.

Q In any event you are aware
of no plans in that area?

A No.

MR. MARSHALL: Other than what
it describes. You have had the operations and maintainanc
panel before you and they have told you what the sur-
veillance plans are.

MR. SCOTT: I am not concerned about
the surveillance plans at the moment Mr. Marshall. In
Mr. Hemstock
any event/you don't know anything further about that
subject?

A No I think that covers it.

Q So I can put it this way.

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McCart Minning, Williams.
Cross-Exam by Scott

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If you conduct your surveillance as religiously and as faithfully as possible, if it should occur that between surveillance trips the kind of damage that is done on the root by strangers that will, the fact that that damage has occurred will be the responsibility of government.

MR. MARSHALL: Well...

Q Or somebody else? The responsibility of somebody else.

MR. MARSHALL: That is a question of law as to what the permit requires. The permit may require the applicant to take restoration steps. Mr. Scott, it may be that the pipeline company would have to take steps to insure pipeline integrity regardless of who caused the disturbance and this may well be spelled out in the right of way agreement.

Q Well I am not concerned about pipeline integrity, Mr. Marshall.

MR. MARSHALL: The environmental integrity, these things may be stipulated in the agreement itself.

Q All right. Mr. Hemstock. as an environmentalist let me ask you if you recognize the general desirability of regulation to prevent these environmental events from occurring rather, ^{than} the simple stipulation as to how they should be remedied?

A Well it is certainly a simplification but obviously the best way to handle this situation is to prevent the damage in the first place and

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2 I would think that whatever could be done to prevent
3 those kind of things ought to be considered first, as
4 a priority. I might point out though that certainly if
5 there were enviromental damage, or if there was something
6 done that might eventually cause enviromental damage, it
7 would seem to me that our pricirity would be to repair
8 that without worrying about it at the time, who may have
9 caused it, or what the situation legally might be and we
10 would certainly see to it that it was fixed.

11 THE COMMISSIONER. Let me just
12 interrupt in this discussion, Mr. Hemstock. You
13 have been I visited Trans Canada's site near
14 Kingston last winter when they were looping the Trans
15 Canada Pipeline and we visited a compressor station with
16 a gentlemen then with Trans Canada who is now with
17 Arctic Gas, who was on one of the panels. I have for-
18 gotten his name and a bulldozer had hit the main line the
19 night before and there had been a break in the stoppage
20 or an outage, whatever you call it' and so somebody was
21 trespassing on your right of way with a bulldozer and
22 presumably this wasn't something that was being in the
23 way that had been agreed, if anyone had ever agreed that
24 this bulldozer operator could use it. Now that was/builtⁱⁿ
25 up urban area. In a remote area like the Arctic and the
26 sub-Arctic, you have bulldozers too, because you have the
27 seismic crews and if you build this pipeline there will
28 be a very greatly increased seismic activity. seismic
29 work I mean, not seismic activity. Oddly enough I
30 visited a seismic crew in April near Aklavik and they had

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McCart. Minning Williams.
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a blow out from one of the holes where they were blasting while I was there, just after I had been told that this kind of thing seldom ~~has~~ ever occurred. I don't know whether I act as kind of a jinx to these things, but if you build this thing you will have enhanced seismic work and Mr. Owen's report, you may or may not have been here Mr. Scott when Mr. Hollingworth cross-examined Mr. Owen, but it was in many ^{ways} a very effective cross-examination. So, all that Mr. Owen said may not be something that we should accept in its totality now but in any event there had been a lot of crossing and recrossing and going down and up that right of way and it has created in many places an awful mess and it appeared at that time that Pointed Mountain or West Coast hadn't made any settled arrangements with the seismic contractors or the oil companies or whoever and it also appeared that they were surveillanced by government agencies was limited.

Well that is the kind of thing that I am concerned about in the long run here that there will be a lot of ^{use} made of your right of way if it is built by, especially by seismic people who are using heavy equipment and crossing and recrossing and these activities really aren't subject to close surveillance and yet we have seen on Pointed Mountain, as I say, the effects that Mr. Owen cited in his report were discussed at length in cross-examination, but we see what can happen. Well that is my concern. I don't know whether I have added anything to this but...

MR. SCOTT: Well, the only point

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2 I would add Mr. Hemstock before you answer is simply this;
3 that trespassers or strangers can do enviromental damage.
4 That is evident, without any responsibility on Arctic
5 Gas's part, they can do enviromental damage to Mr. Dabbs
6 plants and to erosion solutions and all the rest of it.
7 I am looking for a way to prevent that before it happens,
8 rather than spending a lot of time afterwards debating
9 whose fault it was. Now, what I am really asking the panel
10 is, can you help me at all by presenting a way to prevent
11 this from occuring on your pipeline right of way?

12

WITNESS HEMSTOCK: Well it seems

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14 to me that the government has already set up the vehicle
15 will,
16 which/ if it is properly administered, allow that pro-
17 tection and that is the land use permit arrangement. And
18 before any seismic party can start on a program they
19 have to outline in detail what lines they are going to
20 survey and where they are going to go and they are sub-
21 ject to legal action if they move off those approved
22 plans. It is a matter simply then of integrating the
23 land use permit procedure to make sure that such actions
24 are not taken across the pipeline without first Arctic
25 Gas's knowledge and then without adequate protection for
26 crossing the pipeline itself. I might point out that the
27 majority certainly of the seismic operations are done
28 in mid-winter when the ground is frozen. In the North
29 the pipeline will be, in the, bonded right into the
30 perma frost, so that while I wouldn't like to see it
happen, I don't think it should happen that any un-
authorized vehicles travel across the pipeline, the

Clark, Dabbs. Harlan. Hemstock.
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2 chances are that the, a cat tractor for instance or a
3 seismic crew could cross the line without causing any
4 great problem. They might very well do some enviro-
5 mental damage to the surface of the right of way and
6 that again would be a matter then, the records of who
7 did the crossing and at what time should all be avail-
8 able. The land use permits require regular inspection
9 by government people, government inspectors. So there
10 is surveillance of those activities.

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Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 Q Well now, let's get onto
2 the matter I started to ask you about this morning,
3 and if I can leave Dr. Harlan and Dr. Clark for a
4 moment, I'd like perhaps to begin with Mr. Williams
5 and talk about the environmental impact of construction,
6 and I'm talking about the construction process at the
7 moment, Mr. Williams and to put it as directly as
8 I can, in relation to the construction process, if
9 you're -- what do you think the environmentalist of
10 ten years in the future will be after you about if
11 your construction controls or mitigating measures in
12 construction fail? Just in point form, what are the
13 things that are important?

14 WITNESS WILLIAMS: At this time
15 we're limiting it to environmental rather than socio-
16 economic, are we?

17 Q Yes, we're trying to
18 leave out two things, social-economic and primarily
19 engineering, if you follow me.

20 THE COMMISSIONER: Are you
21 saying ten years from now, or ten years after the
22 pipeline has been constructed?

23 MR. SCOTT: Either one, I
24 won't ask you to be too precise. What I really want
25 you to zero in on is terrain, what are the construction
26 -- what are the impacts of construction, the construc-
27 tion process that in terrain matters will lead to
28 complaint if your mitigating processes fail?

29 A Oh, I would think the
30 most complaints or potential complaints would come from

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1 water crossing procedures or restoration.

2 Q Are you thinking of water
3 crossings at rivers, creeks, is that what you're - ?

4 A Yes sir. The construc-
5 tion of all-weather roads in a few locations that
6 allow access to areas, I think might cause concern al-
7 lowing hunters in from the south. Possibly the con-
8 struction of stockpile sites along the Mackenzie
9 River might not be aesthetically acceptable to some
10 people.

11 Q Stopping there, is the
12 stockpile site problem, as you see it, primarily an
13 aesthetic problem?

14 A Of course I'm assuming
15 that it's done properly and that it doesn't cause a
16 failure on the bank of the river. If that occurred
17 that would certainly be objectionable.

18 If again inadequate cleanup
19 procedures were adhered to, leaving parts of equipment
20 around, it's not aesthetically pleasing.

21 Because of construction
22 allowing a siltation situation to occur to affect
23 wildlife.

24 Q Would it be correct to
25 say that, having listed those things, that obviously
26 you want to do everything properly and in good order,
27 but that the siltation of water courses you see as
28 a matter deserving of priority consideration?

29 A I think, Mr. Scott, that
30 the other one -- I think the potential damage due to

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Cross-Exam by Scott

1 siltation has maybe been overstated from time to time.
2 I would think that providing the access may in the
3 long term could cause the most complaints rather than --

4 Q You're talking about
5 access roads, are you?

6 A Yes, or the clearing of
7 a right-of-way to allow a skidoo passage and things like
8 this. That may cause more complaint than the
9 siltation.

10 Q Perhaps that's because
11 people are involved in that rather more directly than
12 they are in siltation, would you agree?

13 A Yes.

14 Q Mr. Hemstock, would you
15 agree that when talking about impacts of construction,
16 would you agree with that rough list that Mr. Williams
17 has given us and generally the two priority items
18 he seems to have emphasized?

19 WITNESS HEMSTOCK: Yes, I
20 would agree with that. I would perhaps go one step
21 ~~back~~ further which may not be within your question but
22 it seems to me that the location to start with before
23 your construction, the actual location of the pipeline
24 is very important and that if for some reason we have
25 wrongly located the pipeline, that in the long term
26 would be a concern.

27 Q I don't think I asked
28 Mr. Williams really to comment on that. We were
29 talking just about construction, but that, I take it,
30 is an item that you would regard as a priority item.

Clark, Dabbs, Harlan, Hemstock
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1 A Yes.

2 Q What about the other
3 items that Mr. Williams commented on?

4 A I would agree with them
5 and with about the same priority that he's put to them.

6 Q Directed either to Mr.
7 Williams or Mr. Hemstock, do I take it therefore from
8 your observations that the aesthetic issue, that is
9 the scar on the landscape theory, is in your judgment
10 not likely to be a major source of complaint or a
11 difficulty?

12 A In my judgment it's
13 further down in the priority list and I put it there
14 because much of the area is simply not seen by many
15 people and therefore I would think it is of less
16 importance than some of these other factors. It's
17 certainly a factor, though.

18 Q Do you agree with that,
19 Mr. Williams, generally?

20 WITNESS WILLIAMS: I certainly
21 agree that it's less important, but if you're going to
22 take a statistical analysis of all the complaints,
23 it may come pretty high because things get reported
24 from what people see and sometimes they are of course
25 blown out of proportion. They may look bad, but environ-
26 mentally maybe they're not that serious. So it's
27 pretty difficult, Mr. Scott.

28 Q Is that sort of represen-
29 tative of the view that sometimes from people there
30 are more complaints about gas cans lying around than

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 there are about substances getting into the water,
2 simply because it's visible, obvious, and can be
3 reacted to.

4 A I think that's correct.

5 Q Well now, Mr. Williams,
6 again for you, let's talk about the impact of operations
7 and maintenance in the same way. I know what you've
8 told us in the statement about impacts if all goes
9 well. What about if things don't go so well, what
10 are the difficult areas likely to be in some priority?
11 What are the problem areas in priority?

12 WITNESS WILLIAMS: It's difficult to divide
13 the environmental and socio-economic aspects, it's
14 very difficult, but I guess --

15 Q Include the socio-economic,
16 if you want. I don't want to parcel this up too much.

17 A I should try to leave it
18 with someone better qualified, I guess.

19 Q Well, you're a people.
20 What I'm getting at is we've heard everything from
21 forest fires to toxic substances being spilled, to
22 a whole range of potential risks that may be incurred
23 in operation and maintenance, and really what I want
24 is your judgment about the important risks there and
25 some priority attached to them.

26 A Yes, and we have to talk
27 about the seriousness of the problem rather than the
28 number of complaints, I think, Mr. Scott.

29 Q Precisely. You know,
30 we've heard about bears getting in through the fence

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1 and we've heard a whole range of things, and let's
2 see what the serious impacts are.

3 A The repair of failures in
4 summertime is going to be a difficult situation and
5 environmental damage is going to result, no question.
6 We think it can be restored, but it is going to occur.
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McCart, Minning, Williams
Cross-Exam by Scott

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2 What I was going to say about
3 the social-economic aspect was the influx of people into
4 the northern communities and the only ones that are
5 going to stay any length of time are the operation
6 and maintenance personnel. That may be--that could
7 lead to lots of complaints, I guess. The scheduled or
8 unscheduled patrol by aircraft during certain seasons
9 of the year will result in some complaints.

10 I wouldn't see the noise
11 of the compressor stations being a big issue. It would
12 be nice to have a little more time to think about this.
13 It's a little difficult.

14 Q I understand that, but if
15 I may respectfully say so, I think perhaps it is the most
16 useful discussion I have had because I am getting
17 some sense of what you people judge to be the serious
18 problem so that I don't have a maze of a hundred
19 problems, some of which are either trivial or aren't
20 likely to occur. If you think of others, you let me
21 know because I'd like to make a list of serious problems
22 and I take it then in operations and maintenance, your
23 judgment at the moment is that the most serious problem
24 is the possibility of having to do repair work in
25 summer.

26 MR. MARSHALL: Mr. Scott, the
27 operations and maintenance panel dealt in detail with
28 the various problems. So it has all been put before
29 you. You've had a full opportunity to cross-examine
30 on it. Now, you spring a question on Mr. Williams

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

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2 whose expertise is in the construction area asking him
3 what major impacts are going to be in operations and
4 maintenance and as he said, he hasn't got much time
5 to think about it. He is trying to be helpful and
6 it may be of some interest to you but surely this is
7 one small part of all you have heard pertaining to
8 this.

9 MR. SCOTT: I seem to be having
10 Mr. Commissioner, less trouble with the panel than with
11 Mr. Marshall. I recognize that, but fortunately I don't
12 have to get answers from him. Now, I recognize the
13 problems in asking questions that the panel may not
14 have had enough opportunity to consider fully and I
15 respect completely their right to say that they haven't
16 given much thought to it and their right to amend or
17 add to answers later if they want to do so. But I'm
18 sure they've made some judgment about what problems are
19 serious and what problems are trivial and I would just
20 like to have that judgment now. Mr. Hemstock, could you--?

MR. WILLIAMS:

21 Just before Mr. Hemstock, you did
22 mention forest fires and I could see forest fires
23 causing problems to the pipeline, to the stability of
24 the ground if a fire crosses the line. I can't see
25 too many forest fires originating from pipeline
26 maintenance--construction^{and} maintenance operation.

27 Q Mr. Hemstock, do you have
28 any comments in terms of operation and maintenance
29 impacts on what Mr. Williams says --I admittedly, I
30 admit very much^{has} off the cuff given us.

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MR. HFMSTOCK: I would not quite agree with his priority. I would again just quickly, I would think that in the long run that we would have more complaints and probably more environmental concerns as a result of the regular activities of the operation and these would probably be first the surveillance flights. They would be required on fairly regular intervals and they will cause some disturbance to wildlife, probably particularly to birds.

I would think that perhaps the next concern would be from noise and disturbance from the compressor stations themselves and again this is a continuing operation and will be there year around. And particularly if there are other developments which put people in close proximity to those stations, obviously we're ^{going to get some complaint} or concern about the noise and there may well be some, I would think, minor disturbance of bird populations as a result of the noise from the compressor stations.

I think that the next -- in order of importance I would put is the additional people which are involved and which will, if they live in the north, obviously want to share in the recreation potential and the hunting and fishing which is here.

I would put repairs as pretty low on the list because I think that they will occur so rarely and there is so little chance that there is going to be one in an area of great environmental concern that I would think on a probability basis,

Clark, Dabbs, Harlan, Hemstock
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2 that would not be a great deal of concern to an
3 environmental person.

4 Now, fires, I would agree
5 with Mr. Williams. I think that the likelihood of
6 additional fires as a result of the operation itself
7 is very, very slight. I think that there would be
8 some likelihood just because there are more people
9 around, but again, as we said in the application the
10 extra surveillance, the extra number of people who are
11 out looking for changes in the landscape will find those
12 fires and the extra additional people will aid in
13 keeping them in the smaller areas so I don't see that
14 it as particularly important.

15 Q Does anyone else on the
16 panel want to make a comment on that general area?
17 If not, we will pass on to the next one.

18 Dr. Harlan, we heard a
19 great deal of evidence from you and from others dealing
20 with the effects of chilled pipeline on surface and
21 subsurface drainage and we've also had a detailed
22 report on the drainage and erosion control measures
23 that you have proposed or that the applicant proposes
24 in order to limit disruption of surface drainage across
25 the pipe, or across the mound, and the blockage of
26 subsurface drainage by the Templeton Bulb or whatever
27 were we calling it some time ago. I wonder if you can tell
28 us just in much the same way the, in an environmental
29 perspective as far as you can, the serious impacts
30 that these measures are designed to guard against and

Clark, Dabbs, Harlan, Hemstock
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1
2 attach some priority to each of them?

3 WITNESS HARLAN: A With
4 regard to the drainage and erosion control measures
5 probably the most serious impact in which they are
6 designed to mitigate against is slope instability. This
7 is deep-seated slope failures.

8 I guess the second area
9 would be related to river crossings. In other words,
10 to prevent unnatural migrations of river channels or
11 slope failures associated with river crossings.

12 These would be the two
13 main areas.

14 Q What is the environmental
15 term is the impact of a slope failure? In other words,
16 what I am trying to ask you to do is to measure these
17 concerns, not from the point of view exclusively of the
18 integrity of the pipe, but from the point of view of
19 the terrain environment. Now, obviously the two are
20 connected inextricably in many instances but --

21 A I have difficulty with the
22 question and then I'm not sure how we really evaluate
23 the environmental effect. Is it the number of complaints
24 from an environmentalist?

25 THE COMMISSIONER: No. Let
26 me say. I think that you should use your own. Forget
27 about what somebody is going to complain about--use
28 your own judgment about what the most serious problem
29 will be if the measures you propose fail. That is what
30 I am concerned about. Not what you think someone is

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1 going to be screaming about in ten years. What would
2 you be screaming about if things went wrong?
3

4 WITNESS HARLAN: For example,
5 slope stability or slope failures within the Mackenzie
6 Valley are not unusual. They are very common. One
7 additional slope failure doesn't upset me. A great
8 number of them associated directly with the pipeline
9 would in terms a great deal of erosion associated direct-
10 tly with the pipeline would be environmentally upsetting
11 to me.

12 MR. SCOTT: Q Well, let me
13 pursue it. If there were a great number of slope
14 failures, why would that upset you? Leave aside for
15 the moment the integrity of the pipe perse Is it
16 because it would lead to siltation of water courses
17 or what is the crux of that impact?

18 A Well, as I mentioned,
19 there are a great number of natural occurring slope
20 failures. These also contribute to sediment loads in
21 the rivers so I'm not sure that the effect of one
22 additional slope failure on a river would have much
23 of an incremental impact.

24 Q Well then, what in your
25 area, is the significant environmental impact? You
26 see, I think you have hit the nail right on the head.
27 We've all been talking about slope failure caused--
28 or I shouldn't say you have, we have--we have been
29 induced by our own emphasis to talk about it as if
30 the failure of a slope was, you know, the most

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1 environmentally damaging thing that ever happened. As
2 you pointed out, it happens all the time and no one
3 should be surprised about it. So therefore, the failure
4 of a slope perse is not in environmental terms
5 perhaps a high priority item. Now, what, in terms
6 of erosion and drainage problems, if any, are the high
7 priority items for the environment?
8

9 Now, can I help you by
10 suggesting one, and it's one that Mr. Williams gave us.
11 I presume that in a sense the highest, or a high environ-
12 mental impact is necessitated when you have to return
13 to do repair work in the summer.

14 A Yes, most of these are
15 from a cosmetic or aesthetic point of view.

16 Q But wouldn't it be correct
17 to say that the integrity of your design solutions are
18 really directed at (a) the integrity of the pipe and
19 the environmental significance of that is that you won't
20 have to re-enter a subsequent year to ^{do} repair?

21 A Yes, I believe that is
22 correct.

23 Q All right. Now are there
24 any other environmental impacts that you regarded in
25 your area as significant or important?
26
27
28
29
30

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 Q Mr. McCart, do you want
2 to comment on?

3 WITNESS HEMSTOCK: I might
4 comment on it. I would think that our greatest con-
5 cern here in installing drainage and erosion control
6 would be to try and avoid a change in habitat, a change
7 in the plant and vegetative cover in the area. I think
8 perhaps next in order of priority would be to avoid
9 the cutting off of drainage of downstream drainage
10 patterns and that the aim of the controls should be
11 to avoid a change in the lake or river or stream lake
12 level or stream flow, because that would have downstream
13 and more widespread effects; and I think that I would put
14 siltation probably at the bottom of the list because
15 from what Dr. McCart's -- what I've gotten from Dr.
16 McCart's study, it would appear to me that this kind
17 of an impact from an environmental standpoint is
18 pretty well localized, and I would put it ⁱⁿ below the
19 other two. Perhaps Dr. McCart would have some
20 additional comments.

21 Q I'll just emphasize
22 again what I'm trying to get. We've been talking for
23 months from the engineering perspective. This is an
24 environmental panel. I want to talk about, turn it
25 180 degrees around from the environmental point of
26 view. Dr. McCart, do you want to add or --

27 MR. MARSHALL: Well, I might
28 just comment, if I can. You pointed out to the wit-
29 nesses that the pipeline integrity aspect, sir, is
30 intricately bound up in the environment protection

Clark, Dabbs, Harlan, Hemstock,
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1 aspects, and in fairness to Dr. Clark, that should be
2 pointed out.

3 MR. SCOTT: I accept that
4 as if it were written in the Bible, Mr. Marshall.

5 WITNESS McCART: I'm not quite
6 sure what I'm supposed to be commenting on here, the
7 effects of sedimentation or what is it? Do you want
8 me to give a list of what I think are my priorities?

9 Q All right, why don't
10 you do that?

11 A Well, you know
12 I actually outlined many of these things in my Phase
13 3 testimony on page 19, there is a list of the things
14 about which we have been concerned, and I can add a
15 few things to that. I would preface my remarks by
16 pointing out that we are concerned in large part about
17 localized problems, and particularly in the area of
18 what we have classified as local areas, critical areas
19 of populations of aquatic organisms.

20 Now, in the way in which I
21 define a critical area, a critical area is an area in
22 which a change in the habitat or some change, physical
23 change which results from pipeline construction would
24 affect a significant portion of a population. It's not
25 an area in which we have a few overwintering fish or
26 a small proportion of a population, but an area where
27 a major proportion of the population might be affected
28 so that in the long term either the size of the popula-
29 tion would be reduced, or the population would be
30 entirely eliminated. With those comments -- and I can

Clark, Dabbs, Harlan, Hemstock
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1 go through and indicate some of our areas of concern,
2 and indicate the importance to be attached to some of
3 these. First of all, siltation, of course we are --

4 Q Could I interrupt you
5 just to ask one question?

6 A O.K.

7 Q You said that your primary
8 concern is with critical areas, and do I take it that
9 if it were a question of priorities, you would attempt
10 to, if it were a question of priorities and you were
11 concerned about erosion or slope failure, you would
12 try to zero in not on all the slope failures that occur
13 along that entire length of the pipeline, but on the
14 slope failures that are adjacent to, or may affect those
15 critical areas?

16 A That's correct, yes.

17 Q So that would it be
18 correct to say that as you look at erosion and drainage
19 and slope problems, you look at it not as a generalized
20 problem affecting the entire route, but rather as a
21 problem that relates to specific areas that you either
22 have defined or are in the course of defining.

23 A Where it might have some
24 long-term effect, or a major short-term^{one}, I should add,
25 on populations of aquatic organisms, not just fish, I
26 might add, but other organisms who might inhabit the
27 area.

28 Q So, that if instead of
29 trying to solve every slope failure problem, you could
30 give us perhaps the names of 10, if we gave you time

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1 might want to solve particularly.

2 A I would be primarily
3 concerned with ensuring that slope failures didn't
4 occur in the vicinity of critical areas. I think that
5 from other viewpoints the aesthetic one, for the
6 integrity of the pipeline we don't want slope failures
7 at all, but we're most concerned from an aquatic
8 point of view with those which would affect populations.

9 Q Well now, I interrupted
10 you. Can you go on without treading too much on your
11 evidence in Panel 3?

12 MR. MARSHALL: Well, it's all
13 in his evidence in Panel 3.

14 MR. SCOTT: Well, I understand
15 that, Mr. Marshall, but we seem to get along all right
16 now. Perhaps what we're trying to emphasize now
17 and it's hard to isolate, is terrain impacts, and I
18 simply wondered what judgment you make about what
19 Mr. Hemstock and Dr. Harlan had to say.

20 A It's very difficult to
21 separate off the terrain impact. Siltation, some of
22 these things that I'm concerned about are biological
23 problems, obviously, come under more strictly biological
24 concerns that we're going to describe in Phase 3,
25 but I would say siltation is an obvious way, increases
26 in siltation are a way in which a change in the
27 terrain might affect aquatic habitat and thereby affect
28 populations of aquatic organisms. It's true that
29 natural siltation occurs, and in some cases it occurs
30 in the vicinity of critical areas, and it can have an

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effect on natural populations strictly as a result of a natural process. As I say, we're concerned that there shouldn't be siltation particularly in the vicinity of spawning beds or in areas where fish are actively feeding on aquatic organisms. We have made a large number of site specific recommendations regarding particular crossings. Oxygen levels could in fact be affected by changes in terrain. We have indicated in some of our studies that one can conceive of a situation in which materials with a very high organic content and therefore with a significant biochemical oxygen demand could enter an area where oxygen levels were marginal^{and} because they were being degraded with the uptake of oxygen, and it is conceivable that oxygen levels in either a lake or a stream might fall, as the result of the introduction of organic materials.

That would be related peripherally to changes in terrain. I don't think that, incidentally, is going to be a very serious problem in most of the areas which we're concerned. Water sources we would be concerned^{with} if ditching somehow or other interrupted the aquifer supplying springs where there were significant populations, or a significant proportion of of aquatic organisms were living. This could be serious, but we also think that this is a situation where it's relatively easy to identify these cases so that in that sense, although it could be significant under some circumstances, we feel that we can identify these things in advance.

Obstructions to fish passage,

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 I have a section in my Phase 3 testimony where I
2 indicate that access roads with culverts or the con-
3 struction of berms at some crossings could in fact
4 obstruct the upstream migration of fish. This is a
5 major concern to me, and we have defined mitigative
6 measures which ^{should} allow any population to pass upstream
7 without any difficulty, we hope.

8 Borrow sites, I think we've
9 covered borrow sites to some extent, but we are con-
10 cerned about borrow sites that are either in the
11 active flood plain or whether they are on terraces
12 or on the fossil flood plain or wherever they are,
13 where there may be the possibility of additional sedi-
14 ments moving downstream and into streams or into lakes
15 affecting critical areas particularly.

16 Of course we are well aware
17 of the difficulties there and we have defined, we
18 hope, mitigative measures which would reduce the
19 possibility that populations will be seriously affected.

20 Access is a concern to us.
21 I think that fish populations in the Arctic are much
22 more likely to suffer serious damage from fishing
23 pressure of one kind and another, than from any damage
24 resulting from a pipeline.

25 I think that essentially covers
26 -- I might point out that one of the advantages of the
27 use of snow roads, is that the additional access is
28 very limited as opposed to working off a permanent
29 pad such as the haul road which accompanies the
30 Alyeska Pipeline. This is one way of ensuring that

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 access continues to be extremely limited to these
2 areas.

3 Q Dr. Clark, we've heard a
4 lot about frost heave in unfrozen ground from an engineer-
5 ing or a pipe integrity point of view. I'd like your
6 comments about whether there are implicit in that
7 problem serious environmental hazards and what they
8 are in some kind of priority?

9 WITNESS CLARK: I wouldn't
10 rate frost heave at the top of the list of being a
11 serious environmental hazard because it takes place
12 relatively slowly, and if we miss an area, say that
13 we didn't anticipate frost heave in, hadn't taken it
14 into account, we would have time to get back in there
15 when there is winter access and could apply the sur-
16 charge load, for example, without having to disrupt the
17 area during the summertime.

18 The environmental impact of
19 frost heave is that in order to inhibit it we have
20 to build a berm, we have to re-shape the terrain. It
21 has an influence on the drainage of that area.

22 We have to ensure that berm
23 breaks are maintained. If they're not maintained,
24 they're heaving as well and ponding could occur.

25 The particular land form is
26 of a surcharge berm is not that much different in
27 shape from a highway cross-section, and the difference
28 is that it would be re-vegetated, it would appear
29 as a broad dyke.

30 Q Well, would you agree
31 with this summary, that leaving aside the engineering

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 issues, that what appears to you to be the most
2 serious potential difficulty with the heaving of the
3 pipe in unfrozen ground, is the drainage implications
4 of that, if any.

5 A Yes.

6 Q And I take it that a
7 subsidiary problem is the necessity to return to add
8 to the berm with the proviso that that can much more
9 likely be done in winter than in summer?

10 A Yes.

11 Q Is there anything else
12 that strikes you about frost heave seen from an
13 environmental perspective?

14 A Forgetting, of course,
15 about the pipe as a structure?

16 Q Yes.

17 A No, not from strictly
18 the environmental point of view.

19 Q Well, let me put these
20 three possibilities to you and ask you to compare
21 them and sort of rate them from an environmental
22 point of view, if you can, how important do you consider
23 the environmental problems could be if (1) option (1)
24 a 6-foot berm were built when the pipeline is laid,
25 option (2) the ground surface above the pipe were
26 to heave but a berm was not built, and option (3) a
27 berm is built after operations have begun. From an
28 environmental point of view, if you can.

29 A Probably the least would
30 be if no berm were built, and the ground were to heave.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
CrossExam by Scott

1 Of course one has to say how much it will heave, if
2 it heaves six feet, it will have the same shape as the
3 berm would have had when we started.

4 Q Well, leave Dr. Williams
5 out of it just for the moment, and take your own
6 understanding.

7 A No, that really doesn't
8 have bearing on his testimony, but the type -- a heave
9 of six feet wouldn't be a strictly localized heave
10 over the pipe, it would be a broad area several
11 tens of feet wide that would heave.

12 The second -- I don't think
13 it would make a great deal of difference, but I think
14 the second would be if the berm were built initially,
15 and the third would be if the berm were built in two
16 stages.

17 Q I take it that all of
18 those options are going to require the introduction of
19 some kind of cross-drainage technique.

20 A Yes.

21 Q And would your observa-
22 tion be the same with respect to that that the solution
23 that introduces cross-drainage is environmentally
24 in environmental terms likely to be the least damaging?

25 A Yes.

26 Q Mr. Hemstock, have you
27 any observations about that environmental approach to
28 the problem of frost heave and the analysis that
29 Dr. Clark has made about it from an environmental
30 point of view?

Clark, Dabbs, Harlan, Hemstock
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WITNESS HEMSTOCK: I

certainly don't agree with the general approach. I think that I would disagree with Dr. Clark's rating, and I really hesitate to get into this, but it seems to me that a heave with no berm, he would have to go on and accept then that the pipeline itself was coming up toward the surface and this would inhibit drainage, and that would have some environmental impact. It seems to me -- so I would put it as probably the least desirable from an environmental standpoint.

I would also rate the 6-foot berm built at the start, again, as perhaps not as desirable as a berm which was built afterwards. It seems to me, and perhaps this is just a practical aspect, that a berm which is built afterwards is built only where it is required and because it is being built, the necessary drainage measures are taken, and I would think that the drainage above and below the pipe would be maintained. I guess the concern I have is that if you erect a berm at the time of construction, a 6-foot berm at the time of construction, you are probably are using an unnecessarily large amount of material and hence more borrow and you're probably putting it in many places where it's not required, and this seems to me to be less desirable than watching it carefully and putting the maintenance on as the line is ^{being} operated and putting it only where it's required.

Q Well, supposing Dr. Clark suggested to you that to do it that way would mean that you would have to go back and reopen all those beautifully

Clark, Dabbs, Harlan, Hemstock
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1 terraced gravel pits.

2 A That wouldn't cause me
3 any great concern, and I would also see that the
4 -- I think he mentioned that he would see the berm
5 being constructed during wintertime, so that the access
6 would cause a minimal amount of surface damage.

7 Q So I take it that you
8 would list -- or you would assess it that way, even
9 bearing in mind the possibility of a return to get
10 gravel from the gravel sources.

11 A Yes.

12 Q You've been weighing that
13 in. Dr. Clark, do you have any comment, or are you
14 content with your rating?

15 A This is rebuttal time.

16 WITNESS CLARK: I think we
17 were talking about essentially the same thing, except
18 perhaps our assessment of the berm. as I gather,
19 we both agree that the least environmental impact is
20 to no berm.

21 Q No, I think Mr. Hemstock
22 thought that you better do it all right away, or I'm
23 sorry, do it in option (2).

24 A Only put the berm in
25 if it's needed?

26 Q Yes,

27 A That was implicit with
28 what I said at the outset. You start with no berm.

29 Q I see.
the least

A And the environmental

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 impact.

2 Q Has anyone else any
3 comment to make? Dr. Harlan?

4 WITNESS HARLAN: I think I
5 would agree with both of them, that it's a matter of
6 degree.

7 Q -I thought you were going
8 to say it's a matter of principle.

9 A Yes. If heaving was a
10 very small amount of heave, that would be my preference.
11 If heaving could interfere with cross-drainage, then
12 alternative (3), that is to construct a berm after pipe-
13 line construction, would be my preference for the least
14 amount of environmental damage.

15 THE COMMISSIONER: That
16 was after the pipeline operation.

17 MR. SCOTT: I'm sorry?

18 THE COMMISSIONER: What was
19 option (3), after pipeline operation?

20 MR. SCOTT: Yes.

21 Q Isn't there a difficulty,
22 if that is your option, in constructing the drainage
23 courses? You have less area on top in which to construct

24 A I'm not sure that I follow
25 that question.

26 Q I'm sorry. Which was the
27 option that you thought was least environmentally
28 damaging?

29 A If heaving, if there is
30 only going to be a small amount of heave, then I would

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 not apply a berm, obviously.

2 Q Yes.

3 A And in that case the
4 option to not apply anything would be the least
5 environmentally damaging.

6 O.K., if heave, if there was a
7 requirement to control heave, then I would favor
8 construction of a berm after the initiation of pipeline
9 operation sometime later over the construction of the
10 berm at the time of construction.

11 Q Well, in the second case
12 isn't there a risk that the drainage courses you
13 would have to create would be more difficult to create
14 across a pipe that has begun to move?

15 A The berm or the surcharge
16 berm does not have to be continuous. In other words,
17 at natural drainage courses you can leave a mound
18 break, or equipment, a berm break.

19 Q Well, now, let's, Dr.
20 Harlan, look at thaw settlement from the same point
21 of view, the environmental point of view.

22 A O.K.

23 Q Go ahead, what do you
24 assess to be the environmental, zeroing in on the environ-
25 mental implications or the serious environmental risks
26 inherent in the thaw settlement problem? To start you
27 off, first of all I suppose there is -- and you may
28 not rank it very high, the visual, the aesthetic
29 element, You don't want to see a trench in the ground.

30 A That's correct.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 Q All right, what else,
3 give some priority to the ones that you think are
4 serious and important.

5 A Well, probably the main
6 one is the aesthetics of a linear trench that falls
7 along the pipeline, but from an environmental point
8 of view you would try to prevent ponding in that area
9 through drainage.

10 Q Well, would it be fair
11 to say then that in terms of thaw settlement, again the
12 primary environmental risk is that of drainage,
13 inadequate drainage?

14 A Yes, it would be.

15 Q Are there any other
16 environmental risks that you see associated with thaw
17 settlement?

18 A I suppose it's the
19 channelization of flow associated with drainage is
20 the main one.

21 WITNESS WILLIAMS: Mr. Scott,
22 are you talking about thaw settlement of a pipeline
23 or a thaw settlement of soil adjacent to a pipeline?

24 Q Well, I'll just ask
25 Dr. Fyles what we're talking about.
26
27
28
29
30

Clark, Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1 DIRECT EXAMINATION (Continued)

2 that he has finessed the issue by saying the settlement
3 of the ground surface, something I ^{might} have ventured
4 myself, I may add.

5 MR. MARSHALL: Have you or any
6 of us any idea what it was all about?

7 WITNESS CLARK: I would add the
8 one of repair. If the pipeline lost support to the
9 point where it was going to deflect differentially and
10 be overstressed and one had to do repair work on it,
11 repair work; the type or repair work that we would foresee
12 as being required and I think it is also the one that is
13 described by Foot Hills, would require that you would
14 go in and dig out adjacent to the pipe, drive down piles
15 on either side and thread through a supporting bar that
16 would then perhaps lift the pipe back up to a level that
17 you want it at and I would say that is a very major
18 operation. Your excavating areas much bigger than you
19 had to excavate for the original ditch. Your driving
20 piles and causing more disruption to the right of way
21 than you do with a single ditch.

22 Q Mr. Hemstock, do you have
23 any comment on either of those answers?

24 A I would agree with the
25 assessment that probably change in drainage would be the
26 greatest concern and that of course would result in a
27 change in habitat in the area and that would have some
28 impact on wildlife. There would be impoundment of water
29 if there was ~~un~~ settlement along the pipeline. I would
30 agree that it would be a very difficult job to repair it

Clark. Dabbs, Harlan. Hemstock,
McCart Minning, Williams.
Cross-Exam by Scott

1
2 so that if the settlement was going to affect the in-
3 tegrity of the line, of course, the repair would cause
4 alot of problem. Aesthetics I would think would be
5 pretty far down the list because it would be, it would
6 be a relatively narrow ditch and would be. probably
7 carry lots of vegetation because of the moisture and I
8 wouldn't think it would be particularly disturbing from
9 that standpoint.

10 Q Has anyone else on the
11 panel any comments on that analysis of the problem from
12 an enviromental point of view? Mr. Williams?

13 WITNESS WILLIAMS: Well the
14 reason I asked a question about what we were talking
15 about for sure is that if the thaw settlement impairs
16 the integrity of the pipe and remedial measures must
17 be taken at a later date, I would certainly see that as
18 by far the more serious consequence because it is a major
19 undertaking.

20 Q Now let me turn to one other
21 question that has been dealt with in the prepared
22 evidence and elsewhere and that is the subject of aban-
23 donment and I want you to look at it on the assumption
24 that the pipe is not sold for scrap, a possibility I must
25 say never occured to me. and is left in the ground I
26 take it that the, the two differences between that
27 situation, that is the post abandonment situation and the
28 operation stage. of all that the routine pre-
29 ventative measures that you will have to go through
30 during the operation stage are presumably not going to be

Clark, Dabbs, Harlan, Hemstock
McCart. Minning. Williams.
Cross-Exam by Scott

1
2 carried on beyond abandonment at least I would think at
3 the cost of Arctic Gas, maybe somebody else will volen-
4 teer to do it. And secondly the artificial refrigeration
5 of the ground around the pipe will terminate and thaw
6 of the then existing perma frost will commence. Have I
7 got it right? The two significant things that will
8 happen upon abandonment? Is that right, or is there any
9 other significant things that we know are going to
10 happen?

11 MR. COMMISSIONER: The frost bulb
12 will begin to thaw. What was the other one?

13 MR. SCOTT: Well, I presume, they
14 not having volunteered that Arctic Gas will stop
15 monitoring the pipeline. They haven't asked if they
16 could do that yet but I just assumed that that would be...

17 MR. COMMISSIONER: Well the most
18 significant natural thing would the thawing of the frost
19 bulb.

20 MR. SCOTT: Yes but perhaps
21 Mr. Commissioner, the most significant thing will be that
22 Arctic Gas will wind up and surrender its charter and
23 won't carry on with the monitoring^{of}/the site. Are there,
24 apart from those two things that occur to me, are there
25 other differences that occur between the pipeline as
26 abandoned and the pipeline as operative?

27 WITNESS HEMSTOCK: No, I think
28 those are the two differences. I just want to go back
29 though to your question. The pipeline in the continuous
30 perma frost areas would remain permanently frozen in the

Clark, Dabbs, Harlan, Hemstock
McCart, Minning Williams.
Cross-Exam by Scott

1
2 ground. There would be no reason for that to thaw and
3 when it is abandoned in several decades hence. I would
4 think that the right away would be very much the same
5 as the surrounding ground. The concern that you express
6 then about the thaw settlement of a frost bulb would
7 occur in a geographic area where there is sporadic
8 perma frost and where there had been an artificial frost
9 bulb built up, because I would take it that all other
10 things and all other areas, the stability of the right
11 of way would be established by the time the pipeline
12 was to be abandoned. I would think that the abandonment
13 of the freezing, or the freezing process and the carrying
14 of cold gas would cause a very, very slow thawing of the
15 artificial perma frost around the pipeline and I at the
16 moment couldn't see any serious environmental impact as
17 a result of that.

18 MR. SCOTT: Well, I take it I
19 have noted the two differences that will exist when the
20 pipeline is abandoned, assuming it is left in the ground?

21 WITNESS HEMSTOCK: The two
22 differences being the lack of supervision...

23 MR. SCOTT: Supervision.

24 WITNESS HEMSTOCK: And the
25 lack of frozen or refrigerated gas.

26 MR. SCOTT: And you have added
27 the qualification that thawing will occur only in the
28 unfrozen ground, that is of the real frost bulb. and that
29 it will occur slowly. Well now what is the environmental
30 risk in the event that that prediction proves false and

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1

2 that it doesn't occur slowly?

3

4 that
5 want them to assume the frost bulb, once chilling has
6 stopped, won't thaw?

6

7 MR. MARSHALL: You mean you
8 exactly the opposite. As I understand it Mr. Commissioner
9 one of the things that a surveyor of the environment wants
10 to know is what is going to happen with this pipeline
11 after it ceases to be used and that the panel has told
12 us that its estimate is that the frost bulb will slowly
13 thaw over a period perhaps of many, many years. Now that
14 is a conclusion I understand that the panel has drawn.
15 What I am asking is what is the risk inherent in that
16 if that conclusion is erroneous in environmental terms?

16

17 A We have given some thought
18 to this, Mr. Scott and I think what you are getting at
19 is that if the frost bulb thaws then there is a potential
20 of the pipe popping out of the ground due to the ac-
21 cumulation of water in a slurry. slurry mix say and so
22 it is going to float and I don't think that this will
23 occur in a mineral soil, that that situation will exist
24 at least not most of it, not if there is any topography.
25 The water is going to slowly, very slowly run out. If
26 you have a long flat area and let's say that it is
27 organic terrain, that would have no weight to the cover
28 and normally the pipe would float when the material was
29 thawed. Well it is going to be that situation initially
30 and probably that type of terrain will be weighted with
concrete weights. You will have to weight it to get the,

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to get the pipe down initially, but if there was a long flat area of mineral soil that is likely to thaw and present a buoyancy problem, it could be filled with water on abandonment to keep it from floating.

Q Let me ask this. If your assumption should be false, that is that it thaws quickly and apart from the fact that the pipe may come to the surface, come out of the ground and be visually unattractive are there any other enviromental problems that you can put your finger on that are inherent in that situation? Drainage problems, erosion problems, things or that type or indeed anything else that occurs to you?

A I have exhausted my thinking.

THE COMMISSIONER: Well let's
stop for tea, all right?

(PROCEEDINGS ADJOURNED)

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(PROCEEDINGS RESUMED PURSUANT TO RECESS)

THE COMMISSIONER: Mr. Veale?

MR. VFALE: Yes, Mr. Commissioner,
I had a discussion with Mr. Scott at coffee break and
we discussed the George Miller Report and I read the
report during Mr. Scott's cross-examination. I broke
another rule, I guess.

THE COMMISSIONER: Well, you
used to read during his lectures anyway.

MR. SCOTT: That is quite
apparent, Mr. Commissioner.

MR. VEALE: If the truth be
known. I never attended them.

MR. SCOTT: And that shows too.

MR. MARSHALL: He seems to have
profited from his absence.

MR. VEALE: I have flagged a
number of pages which have the offensive comments and
my recommendations is that those particular comments
simply be interlined or rubbed out and the report could
then be made public without any damage to anyone's
reputation or whatever. Fifteen pages out of a total
of ninety-two pages would have to be marked up somewhat
and I don't think that would be of any loss to my
client or to the department. If that is not acceptable
then I would proceed to have the ^{entire} report reproduced in
any event.

MR. SCOTT: I will look into
it if I may, Mr. Commissioner. I haven't seen the pages.

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2 THE COMMISSIONER: Yes, that is
3 the easy way out rather than have a motion for
4 production and get the Department of Justice in here
5 or something. That would slow down the inquiry for
6 two weeks to listen to argument.

7 MR. HOLLINGWORTH: Sir, before
8 Mr. Scott carries on with his cross-examination you
9 will recall that Mr. Williams was asked for some
10 information by Mr. Veale. I understand they've now
11 discussed this matter of Mr. Williams' vague infor-
12 mation.

13
14
15
16 THE COMMISSIONER: So that is
17 ended. Whatever it was.

18 MR. VEALE: The discussion
19 will not be on the record.

20 MR. SCOTT: Before we go on to
21 something else, I would just like to pursue this
22 question of abandonment for a bit. The prediction is
23 that the bulb will thaw slowly. What are the implica-
24 tions in environmental terms if that should not be
25 the case? Apart from the visual effect of having the
26 bulb pop or having the pipe pop out of the ground.

27 Dr. Harlan, you look like
28 the most likely candidate to answer this.

29 WITNESS HARLAN: Unfortunately.
30 Well, there would be thaw settlement would occur in the

Clark, Dabbs, Harlan, Hemstock
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1
2 ground surface would probably or be very close to the
3 original ground surface. There may be potential
4 problems on the slope due to liquifaction, low-effective
5 stress. There may be the diversion of moisture along
6 the pipelines to thaw around the pipelines so there
7 might be erosion--potential erosion problems. These
8 are what I would see as ^{to be} the implications.

9 Q Now, let me turn to another
10 matter altogether, if I may, the subject of re-
11 vegetation and I begin by observing and I assume
12 it's correct that re-vegetation is not in any primary
13 sense a cosmetic function but it is rather an erosion
14 or drainage solution. Would that be correct?

15 WITNESS DABBS. That is our
16 state of objectives. Anything--we use the term
17 cosmetic--would be a lower priority.

18 Q Yes. Well, now, in the
19 original application as I understand it, the standards
20 that were utilized for the re-vegetation specifications
21 were the Canada Department of Agriculture's standards
22 that make soil drainage a dominant factor. Is that
23 correct?

24 A That was--I don't think
25 the word "standard" is the one I would use. I think
26 it was what we cued the seed combinations to.

27 Q I take it what you did
28 was you took the Department of Agriculture standards,
29 if I can use that word for the moment, and simplified
30 them in substance and based your specifications on that.

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A Yes, that is correct.

Q And that standard is one
in which soil drainage is the basic criteria?

A That's right.

Q So, really in applying
that standard, you allow soil drainage to be the
dominant characteristic by which your seed mix is
selected on the understanding that soil drainage
would be a good factor because within ^{it} are represented
a number of other significant factors?

A Yes, I --

Q Soil drainage, in short,
is a cue factor which incorporates within it by its
nature a number of other factors.

A Yes, it integrates a
number of other factors which must be considered.

Q So, for example, if you
use the soil drainage standard, that factor will cue
a number of other environmental factors like texture,
slope, perma-frost and so on.

A That is right.

Q Well now, in the revised
re-vegetation specifications, which you made available
the other day, as I understand it, you have developed
another kind of standard in which erodibility is the
cue factor.

A We haven't developed the
erodibility that has the rating. That has been
developed by the geo-technical engineers and we have

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~~Cross-Exam by S. J. J.~~

1 cued our said combinations to their classifications,
2 yes.

3 Q All right. And I take
4 it the theory of that is that erodibility again is
5 a factor that integrates a number of environmental
6 factors?

7 A Yes, that is so.

8 Q And one of the factors
9 it takes into account is drainage?

10 A And all the factors which
11 drainage integrates, yes.

12 Q Right. Well, now what
13 I really want to know is this. Why at this time have
14 you moved from one rating system to another? Why have
15 you made this change or do you know the answer to that?

16 A I'll comment on that.

17 Q First of all, I take it
18 that the change was made by you or by somebody else?

19 A By members of my staff
20 with my full knowledge.

21 Q Well, did you select the
22 erodibility factor or was that the geo-technicians?

23 A Those factors have been
24 selected by the geo-technical engineers that we are
25 working with.

26 Q Oh I see. Well now, tell
27 me if you can as briefly as you can, why you decided
28 to move from one set of standards to another?

29 A I think move is perhaps

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a better term, Mr. Scott, than your original word
"change" because it is one of evolution and development
of plans and knowledge in this field. The proviso
is made in the table of specifications filed with the
application, the footnote indicating that they would
change or could change as our knowledge of the
area, knowledge of the problem and knowledge of
the behaviour of different varieties evolved through
the course of ongoing research, most of which is still
ongoing and during the past couple of years--

Q Please don't misunderstand
me, Mr. Dabbs, I'm not criticizing you for moving. I
haven't the intelligence to do that even if it was
warranted. What I am asking is what is the rationale
for the change.

A Fine. The rationale which
has been one of parallel evolution both within the
geo-technical group with my own group towards an
integrated erosion control plan. We believe that in
the past year or two we have reached the point where
these plans must be ^{reshed} and we are advising this Commission
and everyone else interested in the project at this
time that we have reached a point where we believe that
the two programs should come together because we have
as our first objective an identical objective to that
of the engineers, their approach being physical
control. We view this as a biological erosion control.
Perhaps one reason why we could not have, or did not
present it in this form two years ago when the appli-

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1 cation was prepared is that the geo-technical engineers
2 hadn't refined their own thoughts or analyses or
3 capabilities to the point where they could advise
4 us of how they will handle erosion ratings in order
5 to design for this condition. In the past year, they
6 have presented to us their thoughts on this and we
7 have found ourselves able to cue our re-vegetation
8 specs to the same system in order that we're not talking
9 to parallel but slightly different systems from one
10 pipeline project.
11

12 WITNESS CLARK: I think, Mr.
13 Scott, from the geo-technical end, perhaps I can help
14 with the question "Why?". I think it was, as I recall,
15 it was stimulated by the recommendations or comments
16 in the pipeline assessment group report. I think that
17 was about the time we initiated the work on the rating
18 system that could be meshed with the vegetation group.

19 Q As I understand the
20 virtue of the Department of Agriculture rating system
21 is that it, because it is soil drainage oriented is
22 that it is responsive to the need of the plant. Is
23 that correct?

24 A Yes.
25
26
27
28
29
30

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WITNESS DABBS: Yes.

Q And that's what we're talking about, if the plant doesn't grow you can throw seed all over the place and it isn't going to do any good, and I take it that you've now moved to a system -- and I've used the word "moved", or developed a system in which erodibility, that is an engineering feature, is the dominant characteristic.

A Perhaps it would be helpful if I were to run for you and for the record the parameters which go into this erodibility rating, and you'll see that in fact the moisture conditions of the site are very important.

Q Well, I can save you the time perhaps if you can tell me what the relative importance or weighting in the erodibility system is of soil moisture?

A The relative rating is extremely high. That is a very important feature, unquestionably, and at a time of final design we know, we will be using this system to specify a mile by mile basis on alignment sheets what particular seed combinations would be used. When we reach a final design stage and I and members of staff around ground we may find within short sections of the line that this rather simplified erodibility rating needs further consideration or refinement, and clearly the site conditions are of major importance.

Q Well, apart from -- is there any way of expressing a relative importance or

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1
2 weighting of soil moisture more precisely than
3 saying extremely high?

4 A I would say if you want
5 it in a percent basis, which is trying to put a figure
6 on something that isn't quantifiable, maybe 90%.

7 Q Well, I take it that one
8 of the results of moving to this improved system is
9 that it has had the advantage of reducing the number
10 of seed mixes that you will require from about 7 to 3.

11 A Would you give me a
12 minute to pull out the older tables?

13 Q Yes.

14 A I'd appreciate the page
15 reference. It's been a while since I looked it up.

16 DR. FYLES: It's 8-B-1384.1.

17 MR. SCOTT: That's not a page
18 number.

19 A If we examine the set
20 of specs that appeared in the application there are
21 three basic combinations. As there are still, it's
22 the real difference, I think, is perhaps in the way
23 it's displayed. In other words, ^{if} we took the permutations
24 and combinations under one region on the new table
25 we would come out with about the same number.

26 Q Well, I think what the
27 concern to which I am trying to direct myself is this,
28 that you've now got erodibility ratings, and there are
29 three over three ranges. Are you with me so far?

30 A Yes.

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Cross-Exam by Scott

1 Q They're called A, B, and
2 C, and they exist each in three geographical areas.

3 A Correct.

4 Q Now you have a stipulated
5 number of seed mixes that are going to be applied in
6 the proportions you indicate in those areas.

7 A Yes

8 Q In other words, you have
9 a plan for seeding. Now, the one thing that hasn't
10 changed throughout all this is the moisture content
11 of the soil in the Mackenzie Valley, and what I want
12 to know is to what -- how much moisture variability
13 can there be across erodibility rating A, B, or C?
14 What is its scope?

15 A I'm not quite sure that
16 I follow your question, but perhaps I could answer it
17 this way, or try to answer it this way. I can foresee
18 a situation where on field examination I might rate
19 a location as moist, moderately to well drained. I
20 can imagine two situations where I'd rate it the same.
21 But for the information fed to me by the analysis
22 of Carlan, of Clark's staff, they will take into consider-
23 ation other features. For instance, the size of the
24 catchment area at any average time in a growing season
25 these two hypothetical sites might have, as I said,
26 a moderate well drained situation, but one may be
27 in the drainage of a much larger catchment area. That
28 is a very important consideration in controlling
29 erosion, as the larger catchment area can in fact
30 funnel more water through the area following a storm

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event than the other. For that situation then I would be alerted to the higher erodibility potential of that area and I would then specify the additional treatment as shown here for an area of high potential erosion ,
soil
even though the moisture conditions throughout the year of the two may be the same.

Q What I'm trying to get at, I think, is what do you do with this rating system when you have areas in which there are particular moisture problems, because without adequate moisture the seed isn't going to grow? Is your scheme precise enough to take into account all the moisture variability that is found across your three erodibility categories?

A Well, I would say it's as precise as the older system which didn't take into account these other conditions that we now take into account. In a statement that I made just slightly earlier^{that} at a final design stage I think maybe this is what is of some concern here, two sides of an approach to a creek may have the same rating, high erosion potential, but one has a south exposure and one has a north exposure. Consequently the surface moisture conditions of the two are different. Plant ecologists would all know that, and in that case final selection of seed for that area might result in some slight change for -- to compensate for the exposure difference.

Q I think the reason I'm directed to ask the question of you is that on page 10 of your appendix you refer, even within these erodibility categories, A, B, and C, to the need for identification

Clark, Dabbs, Harlan, Hemstock
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so that appropriate

of wet areas beyond the categories, that have
a special species can be applied in those areas. So
even with your ratings, A, B, and C, as I understand
that, you're going to have to go further and look for
particular wet areas so you can put a special kind of
mixture in there, is that correct?

A One moment while I review
what's been said.

Q One --

A That's correct, yes.
Yes, that's certainly what we've said.

Q What I'm getting at is
does that reflect upon the inadequacy of your erodibility
rating system, it's obviously not broad enough to take
account of that possibility. Is that a criticism that
can be made of the erodibility rating system?

A Well, if we've identified
it even at this stage I wouldn't review it as a
criticism. We might accept it ourselves, as we
accepted that there will possibly be a further stage
of development, a further breakdown. I think if I
can quote from Dr. Younkin's Report a very short
sentence in the middle of the paragraph that states

"A finer breakdown does not seem warranted."
I would concur with his statement at this time.

Q But I take it that when
you were on the moisture rating, that kind of problem
would not have arisen because the moisture rating
itself would have been keyed to the moisture that the
thing that makes seeds grow, and you wouldn't have

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1 had to isolate special areas where there were moisture
4 problems.

6 A Well --

8 Q First of all, is that
10 correct?

12 A -- that's reasonable
14 enough, I think. However, we need to look at what
16 those moisture areas represent, and they represent
18 positions in the landscape of depressional terrain,
20 where there is a reason for catchment of water, and in
22 those cases it's not they do not then present an
24 erosion problem, and the lighter application of seed
26 and the rate of colonization of these areas, as I
28 illustrated by natives, because of their moisture
30 conditions, is rapid enough that they in fact don't
32 represent an erosion problem.

34 Q Well, let me put it
36 this way and have an end of it and see if I understand.
38 By the errodibility system which you've now, or the
40 rating which you've now done, you've made it necessary
42 to determine on a site specific basis wet areas. Is
44 that right so far?

46 A That's right, however
48 the older system also indicated that we would require
50 at some point in the project site specific investigation

52 Q All right, but by having
54 to determine the wet areas, you run the risk that
56 if that determination is not made under the erodibility
58 system, you may be broadcasting some seed that won't
60 grow.

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Q Well, is there more than one species that is covered by this description in paragraph 5.1, "Meadow species"?

A I believe so. To make a couple right from Table 2, meadow foxtail being an obvious one.

Q Well, the names, I'm sorry to tell you to won't mean anything to me, but what I really want to ask is if you have a number of meadow species that are going to be inserted in this mix for wet areas, have they been tested?

A Oh, yes.

Q All right.

A And shown on the table.

Q Well now, in selecting the species for inclusion in your specifications, I take it that you have relied primarily on the tests that are shown in Table 1 of Appendix "C"?

A Yes, that's quite fair

Q And you've also done some greenhouse tests at Calgary that involved cold soil conditions?

A Yes, we have.

Q Can you tell us in terms the type and duration of the tests that were performed at Calgary?

A Well, duration, of course we haven't reached the end point, These programs are still under way and quite active.

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 Q Well, when did they begin?

2 A Not quite a year ago.

3 I believe late winter or early spring of '75, before
4 some of that equipment was fully operative.

5 To answer your question as
6 to type, The first program that comes to mind is
7 evaluation under cold soils, which are a simulation of
8 conditions in the active layer of the permafrost of the
9 rate and the extent of the development of root biomass
10 of several natives and several selected agronomics,
11 this of course being an important consideration in
12 erosion control is the ability of these plants to
13 develop a root mass which in fact binds the soil.
14 That is one of the programs that we have run that
15 those data are being analyzed and there isn't a
16 report available yet, but it will be at some point
17 this winter. An interesting observation I made of the
18 data is the comparative speed, if you wish, of the greater
19 rate of root biomass production on the part of several
20 of the agronomic varieties named here as compared to
21 several natives establishing even further our contention
22 --

23 Q Well, Mr. Dabbs, I don't
24 want to interrupt you or cut you off, but I think I'm
25 not interested in the conclusions that you've reached
26 at the moment, I'm just interested if you could tell
27 us the tests so that we can identify them and know not
28 what they resulted in but what they were.

29 A The words used was "type"
30 and "extent", and I'll use only the title of the study.

Clark, Dabbs, Harlan, Hemstock
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1 The only other program that I can think of at the
4 moment then with the use of the cold soils equipment
5 has been one of evaluation of problems of nutrient
4 uptake in cold organic soils.

5 Q Well now, have there
6 been any tests that have been conducted over a chilled
7 pipeline?

8 A Yes, the Sans Sault
9 test-site, yes.

10 Q Any other, or is that it?

11 A Well, that's the only
12 program that I have been involved with, with myself
13 of course the research reported by Mitchell at the
14 Prudhoe Bay test-site, that was a chilled pipeline
15 report of work Wyan & Hernandez at the Norman
16 Wells test site, that was also a chilled pipeline.

17 Q Would you agree with me,
18 I shouldn't say "me" because I never heard about it
19 until yesterday, but would you agree with me that there
20 is a difference between a test done in cold ground and
21 a test done over a chilled pipeline for two reasons,
22 first of all because of the nitrogen release, and
23 secondly because of the limitation of soil between
24 the seed location and the top of the pipe?

25 A Oh yes, definitely, there
26 -- anyone in plant science research would admit the
27 direct extrapolation from a greenhouse program to a field
28 situation is difficult and that there are many other
29 factors influencing the growth of plants growing over
30 a chilled pipeline which, that is precisely why some of

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1 the work is done in the greenhouses in order to eliminate
2 those other variables to identify the response of plants
3 to specific points of interest.
4

5 Q But the real test of
6 whether these seeds are going to germinate on the berm
7 out there is going to be determined by a test conducted
8 over a chilled pipeline because of the two factors I've
9 listed, and anything else is extrapolation.

10 A Well, to take your ques-
11 tion and break it down a little bit, the very best
12 test, obviously, is that on a chilled pipeline and
13 consequently the work that was done at Sans Sault,
14 however the word you used was "germination" and the
15 influence of the chilled pipe buried four feet below
16 the ground surface on the soil temperature moisture,
17 which are the two most important features in seed
18 germination, there is no measurable influence of the
19 existence of an operating chilled pipeline on germina-
20 tion. Those conditions can be quite suitably simulated
21 in the field with an equally elevated exposed berm.

22 Q Well, what about --
23 leave germination aside -- what about the vigor of the
24 plant and its longevity, isn't that going to be best
25 tested in a -- over a chilled pipeline such as at Sans
26 Sault?

27 A I quite agree.

28 Q Yes.

29 A However, I could also
30 qualify how this work can be carried on and I believe

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extrapolated in other situations.

Q Well, let me see if I can isolate another significant reason for doing this kind of chilled pipeline in the ground testing. I understand that at Prudhoe Bay, as was revealed in responses to the National Energy Board request for additional information, you may have seen the photographs there was a -- there are a number of photographs which reveal that the pipe or the berm cracked and settled. In the photographs you can see a longitudinal crack of some width, and I presume of some depth that runs across the top, along the top of the pipe.

A I've seen the photographs and I've seen that pipe actually.

Q Yes, and in places there is not merely one crack, but there are cracks leading into it and there is a variety of cracking along the top.

A That's quite right. Now if I could clarify that for your benefit and the benefit of this Inquiry --

Q What, the cracking, or how the seeds are going to work?

A No sir, the condition that you're describing here also existed at the Norman Wells test site established by the Gas Arctic system, and that cracking in the berm takes place over a mode of construction which was currently being investigated at that time, which was a half-buried in berm pipeline,

Clark, Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1
2
3 and that cracking of the berm took place and still
4 persists even with remedial measures, and consequently
5 that mode of construction has been rejected by Arctic
6 Gas.
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Q Well that is something that the engineer to the right will speak to. I am just interested in the vegetation effects to which you can speak and I take it that if those cracks occur it is important to conduct a test in situations in which they occur?

A Yes if that technique was to be used.

Q Would it be fair to assume then that you have in your tests and in your prediction here have assumed then that that cracking will not occur?

A The experience of the group collectively as reported in table one, if you want to look at it that way, Sans Sault test site was built as I am told by the gentlemen on my right, as he described it, to be the best possible simulation of the construction as planned by Arctic Gas and in no case have we observed such cracking of the backfill mound.

Q Could I stop there?

A I would agree with you that if that were mode of construction planned then yes that is where you should be conducting your research. Well, I take it that at Sans Sault where your outdoor chill pipeline tests were done there was no cracking? That is what you are telling me isn't it?

A No cracking of the type described although there was a very slight cracking on one very short plot one year when ^{of} low rainfall. that was just a matter of

Q Nothing of substance?

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A Nothing of substance.

Q Yes. Well, now I am
/Board
advised by this National Energy response that the
cracking at Prudhoe Bay, and they may be right or wrong
occured with both full and partial burial molds. Now
all I am asking you, you will have to for the moment
accept that that is true, all I am asking you is that if
you have to reseed the berm in which that condition
occurs, you are going to have problems that you have not
been able to analyze by testing.

A I would like to ask the
question of Mr. Williams of the probability of that
situation occurring and then I will answer your question.

Q Well let's before we ask
Mr. Williams whether it is going to occur or not, you
take it from me for the moment that it is going to occur.

MR. MARSHALL:

Do you have any reference
Mr. Scott so we can check?

Q The response to the National
/additional
Energy Board request for information, volume three under
tab Prudhoe Berm Effects. Now I take it that if that is
going to occur. it may not, but if it is going to occur
you would agree with me that the tests that you have been
able to do have been done without that kind of growing
environment?

A That's quite right.

Q And because of the cracking
and the possibility that the cracking will reduce the
stability of the soil, you would have some difficulty

Clark Dabbs. Harlan. Hemstock.
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 predicting about whether you can grow your seeds on a
3 berm like that to assure anything like full coverage?

4 A If there is a cracking back
5 obviously there can't be full coverage. There would have
6 to then be a maintenance, part of the normal main-
7 tainence I would assume, would correct for that cracking
8 at which time we would then again have to see. Yes

9 Q Yes.

10 MR. MARSHALL. Well Mr. Scott
11 the witness doesn't have the documents in front of him
12 and he is not aware of this situation and there is no
13 evidence that this same situation, if it exists as you
14 say, would apply to what Arctic Gas proposes to do.
15 unless I am to take it from your comment that that is the
16 case.

17 Q No I am not asking the
18 witness to say whether the berm is going to crack. He
19 wouldn't know that. That is not within his expertise.
20 I am simply saying that if he gets a berm that is like
21 the berm that is reported on to the National Energy
22 Board, what does he say about his tests and he has told
23 us.

24 A Well now, Mr. Scott, if I
25 could and I think perhaps for the value or the benefit
26 or the record of inquiry, ask either for a copy of that
27 document you are referring to or perhaps you can answer
28 to me. That is somewhat presumptuous. Do you know if
29 there are, the test site at Prudhoe Bay had run a hot
30 test through that fully buried section to simulate a test

Clark Dabbs Harlan, Hemstock
 McCart. Minning Williams.
 Cross-Exam by Scott

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of a compressor station failure and if so that in itself
 might then explain to me why they found such an
 occurrence.

Q You agree with me Mr. Dabbs
 that that will be a matter for the engineers?

A Oh quite right but it does
 reflect on the questions that are being imposed.

Q Well yes the engineers will
 tell us if this Prudhoe Bay site is all wrong. But what
 I am simply asking you as a plant biologist, is are your
 tests a good predictor if that kind of condition occurs?

A I think the tests are quite
 useful, quite workable, quite and we can predict from
 them as we have to take into consideration the fact that
 if such events took place, maintenance of the line
 would result in their correcting that and we would then
 have a continuous soil cover for which then we can grow
 plants in and I believe the tests to date then are quite
 useful.

Q But what you're saying, if I
 understand it, is if that occurs you will have to have
 someone patch up the cracks and reseed?

MR. MARSHALL: Well he doesn't
 really know what occurred. He hasn't seen the report.

Q But I am putting to him the
 dilemma. I can show him the pictures of what occurred in
 Prudhoe Bay if he wants to see them.

A Yes I have seen the test
 site and I very much suspect that there is an explanation

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams.
Cross-Exam by Scott

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to that cracking.

Q Well I am sure there is an explanation to the cracking but what I am asking is are your tests going to be of any help if that happens?

A Certainly.

Q You think that your tests tell you whether you can grow seed on a berm like that?

A The seed will only grow obviously in the soil that still remains. It certainly won't grow in the cracks and then of course whatever maintainance takes place we will then be able to seed with what we have found to be useful in this, in the region for which this might take place.

Q But it also won't grow properly or quickly or normally in any soil that subsides on account of the cracks?

A Oh well quite right. It's. we have stated repeatedly, if not in some of the evidence but certainly to our engineering friends that they must provide us with a physically stable condition before we can get grass or anything else to grow. Consequently the statement which we did discuss this morning where they. we are not predicting an effective erosion control cover for perhaps four or five years. I cannot form...

Q Let me ask you this Mr. Dabbs, if I told you and I might be dead wrong but if I told you that the berm on the pipeline was going to look like that, would you want to do some more tests or would you not?

Clark, Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

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A I couldn't imagine what
other tests I would do.

Q All right. Would you be
confident that your seeds would give the kind of coverage
you have described to this inquiry over that berm?

A I think the problem that we
would have in growing obviously is as it breaks up as
shown there is a problem of desecration of the soil and
I would certainly predict there would be, we would have
difficulty obtaining a complete grass cover.

Q Thank you.

A As long as there is no
remedial measures taken.

Q You also did some tests at
Tuk did you?

A Yes there have been studies
undertaking that.

Q Did you supervise those or
have any part to play in them.

A I didn't supervise them in
the field. My only part was in co-ordination.

Q Yes. And I take it that the
test sites at Tuk were twelve feet by twelve feet and
there were three of them?

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 A There have been several
3 studies at Tuk. I am going to have to ask which one
4 you were referring to.

5 Q The vegetative mat tests.

6 A That title doesn't--I'm
7 still not certain as to what studies you are referring
8 to here.

9 Q Well, you did a tundra
10 mat removal project at Tuk?

11 A Yes.

12 Q Yes, and I understand
13 that there were three plots that were selected for
14 re-vegetation tests and they were each about twelve
15 by twelve.

16 A If you were referring
17 to --

18 Q It has probably been
19 turned into a golf course there by now.

20 A The program that I mentioned
21 while giving my slide show I recall that the size of
22 these are approximately twelve feet wide by a hundred
23 or more feet long.

24 Q All right. Now where--
25 at least we have the same test sites in our mind. Now,
26 what was the terrain?

27 A Well, the terrain here
28 was really three conditions. The intent of this
29 program is one of trying to define the type of tundra
30 community in which this technique of stripping may

Clark, Dabbs, Harlan, Hemstock
McCabe, Manning, Williams
Cross-Exam by Scott

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2 be feasible. Consequently, we will have to seek out
3 three different positions in the landscape--one on the
4 top of the ridge, one on the side of a hill to get the
5 shrub tundra and one at the base of that hill in a
6 catchment area or a drainage area where we would get
7 sedge tundra.

8 Q What was the degree of the
9 hill on which you had the test site?

10 A I don't recall. I would
11 have to give you that information later.

12 Q What I want to ask you
13 is bearing in mind that what we are doing here is we're
14 re-vegetating to prevent erosion or slope instability
15 and we are doing it in Arctic or sub-Arctic conditions.
16 Has enough testing been done with Sans Sault and your
17 plots at Tuk to give you any real assurance as to what
18 the results will be over a pipeline the length of this?

19 A I think we have to, in
20 that list, throw in all of the Delta seeding that had
21 been mostly rig sites but associated with those
22 rig sites as shown in the report--progress report--
23 on CAGSL re-vegetation studies, north of sixty. There
24 have been roadways that have crossed streams, a roadway
25 that runs up a ravine within the Caribou Hills. We
26 have a greater diversity of terrain conditions than were
27 presented to us at Sans Sault and at Tuk.

28 Q How many sites did you
29 put down as vegetatives of mat on?

30 A You are referring to a

Clark, Dabbs, Farlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 tundra stripping. Is that what you mean or erosion
3 control mat?

4 Q An erosion control mat.

5 A At the moment, I can
6 think of only the Tuk site where areas were prepared on
7 the side of a hill. In the winter time with a cater-
8 pillar and the tundra removed with a blade and mats
9 laid on that check plot were the same treatment or
10 same conditions but no treatment and of course a
11 control plot.

12 Q Have you got the results
13 on that one yet?

14 A Not in an analyzed form,
15 no.

16 Q When do you expect to
17 have them?

18 A I think we would have
19 a preliminary assessment at some point this winter.
20 The test, I believe, needs to run more than one growing
21 season to conclude.

22 Q Well now, people who have
23 advised me have no criticism of any of this and have
24 great respect for the work that has been done but
25 let me put this question to you. Wouldn't you be
26 happier and, therefore more confident in your prediction
27 if you had more Arctic or sub-Arctic test sites that
28 attempted to simulate much more directly the problem
29 that is going to be associated with erosion and slope
30 instability. That is plots on hillsides. Perhaps

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 over buried pipelines. .Wouldn't you be happier with
3 that?

4 A Well, of course, you're
5 presenting a question to someone of a scientific
6 background and I would have to agree. That doesn't
7 mean that at this stage we aren't confident in the
8 results or our predictions but I have never in my
9 experience met a scientist who wouldn't agree to more
10 study.

11 Q Well, I'm not asking Dr.
12 Clark to increase your budget next year or anything
13 like that.

14 WITNESS CLARK: Good.

15 Q But what I am saying to
16 you is wouldn't you agree--bear in mind the substantial
17 work that you've done but also the novelty of the
18 exercise that your judgment could probably at this
19 stage be said to be confident, I have no doubt, but to
20 be early?

21 WITNESS DABBS: A Well, the
22 intent of the seeding program of rig sites in
23 cooperation with the Delta producers is an attempt to
24 do just what you are speaking of and that is to gain
25 more and more experience in the greater range of
26 conditions as they are presented to us. And that
27 program is continuing; we expect to carry that on and
28 as the conditions are presented to us for additional
29 studies we will, in fact, carry them through.

30 Q Yes, but the rig sites

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 are flat as a pancake, aren't they? You don't build
3 rigs on hills.

4 A When the tops are flat,
5 that's quite true. The flanks, the sides, if you wish,
6 are not. I appreciate that that is certainly not a
7 simulation of a pipeline running up a hill and I
8 think the few roadways, haul roads, that we have
9 experience with have come as close as we can get at
10 this time of those conditions.

11 Q Well, wouldn't you agree
12 with me that your tests--the results you've had--point
13 unmistakably, as you've told us, in one direction but
14 that it is really too early to be conclusive about this?
15 I mean it is not your fault it takes seeds time to
16 grow. Isn't that evident in fairness?

17 A Well, I think that it
18 is evident from what you said and it is also evident
19 from my statements that all this research is ongoing.

20 Q Well, by ongoing, I
21 take it that you mean that you are at a preliminary
22 stage at which you cannot make a confident judgment
23 about what will happen throughout the range of this
24 pipeline on all kinds of terrain?

25 A Well, taking the various
26 parts of that question, I would agree that, yes, it
27 is the position of Arctic Gas that they are at a
28 feasibility stage and that, in fact, a final design
29 stage will have to be on through before anyone builds
30 a pipeline.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 The other part of the statement,
3 whether or not I am absolutely confident is, I think, partly
4 reflected in our very conservative estimate of the
5 time required for us to obtain a full plant cover. We,
6 you might say, passed the buck to the geo-technical
7 engineers and tell them that you will have to design your
8 physical controls to provide us with a stable con-
9 dition and therefore, they don't count on our being
10 able to provide a plant cover for the first several years.

11 But if you are asking me,
12 would I stake my life on a statement that there won't
13 be any problems which your question implied to me.

14 Q Will you tell Dr. Clark
15 that you don't need any more money because you are
16 confident of the results?

17 A I think we're mixing
18 things up a little here. For us to continue the research
19 that I have alluded to will require money.

20 Q All right, Mr. Dabbs.

21 THE COMMISSIONER: But you
22 are confident that all will come right?

23 WITNESS DABBS: We have every
24 reason to believe that, Sir.

25 WITNESS CLARK: You are having
26 trouble with, as I have been dealing with an optimistic
27 farmer.

28 MR. SCOTT: Okay well, my whole
29 interest, Dr. Clark, is to see that adequate funds are
30 made available so that this project can be pursued to

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

its completion.

WITNESS CLARK: I will support
you on that, Mr. Scott.

MR. SCOTT: Well, Mr. Dabbs,
I want to ask you about re-vegetation in some
specialized areas. In the specifications there has
been no distinction as I read them between re-vegetation
in areas where conventional construction will be
done and areas in which Arctic techniques will be
utilized. Is that correct?

WITNESS DABBS: That is correct.

Q Now, if I recall it
correctly, the characteristic of conventional winter
construction is going to be that the surface will be
scraped to provide a working area. Is that what you
understand to be -- ?

A Yes, that is what I
understand.

Q And the snow will be
removed or substantially removed?

A Yes, the operating surface
is kept essentially clear of snow.

Q I take it that the area
of the road is obviously going to be substantially
wider than the area of the berm?

A Yes, as it has been
described, I think, in the construction plan and as I
have observed, I think the Pointed Mountain line
was a good example of this.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

Q Well, we're going to come
to it in a minute, but I take it that in the the
conventional construction area, you are going to have
a re-vegetation problem of much greater dimension be-
cause of the area that will have to be re-vegetated.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 WITNESS DABBS: That's
2 slightly simplified. It's/^{air}greater in area but of
3 course this technique is used in the more southerly
4 regions where the climate is much more suitable for
5 the growth of grass in terms of total ground surface
6 area.

7 Q Yes.

8 A And there is more area
9 to be dealt with.

10 Q Well, in the conventional
11 area, when are you going to seed?

12 A I think we would probably
13 follow the same plan as we have presented in Appendix
14 "C" that much or most of the area could be seeded as
15 a final right-of-way cleanup operation followed with
16 a spring dressing and treatment.

17 Q Well, I take it that as
18 parts of this road will be used to the end of the
19 construction season, would you agree with me that the
20 seeding for the section will have to be left to the
21 end?

22 A I could foresee that the
23 roadway itself would have to await the end of the
24 season or perhaps the spring. The backfill could be
25 seeded at any time.

26 Q Well now, this roadway
27 is going to be, I would think, heavily compacted by
28 the passage of all kinds of equipment up and down.
29 How are you going to rake it and hoe it? I suppose
30 that's what I'm asking,

Clark, Dabbs, Harlan, Henneke
McCart, Minning, Williams
Cross-Exam by Scott

1 to get adequate loose dirt to plant your seeds. I'm
2 no Gibbs, but I have a vegetable garden.

3 THE COMMISSIONER: Well, that
4 changes things, doesn't it?

5 (LAUGHTER)

6 A Well, I don't believe
7 we've ever indicated that we'd rake it and hoe it.

8 Q Well, you see the
9 problem to which I'm directing you. You're going to
10 have a highly compacted surface, it's not going to be
11 like the berm mound, which has just been placed there.
12 You're going to have a highly compacted surface. It's
13 going to be the end of the season and then your seeding
14 function is going to come in, and I suggest to you
15 that you're going to have to do something to develop
16 the terrain in such a way that there's any prospect
17 that the seed will grow, because it may be hard as
18 a rock.

19 A It will be frozen
20 hard as a rock, and I'm sure that it compacts a
21 great deal more because the activities there are
22 during winter when the soil is frozen; but undoubtedly
23 there would be some compaction. You can ask one of
24 my associates on the panel --

25 Q With snow compaction
26 you have no problem. Where there is compaction, what
27 are you going to do?

28 A I would even agree with
29 you more than that. I think there is a problem in
30 seeding onto a bare hard roadway in the wintertime, I

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 don't think that's reasonable at all, and with the
2 spring thaw as observed by myself on the Pointed Mountain
3 line, those areas are not as highly compacted as
4 they seem in the wintertime and in fact the best
5 establishment is if possible on the roadway, and for
6 those cases I would say that that would be part of the
7 spring seeding program.

8 Q Well, I guess what I'm
9 asking is this, when you come to seed that, are you
10 going to do anything to prepare the ground for the
11 seeds? And if so, what?

12 A I did not -- and I'm
13 trying to recall the full length of the Pointed
14 Mountain line which I've visited several times -- don't
15 recall the need for any special preparation. However,
16 forgetting the Pointed Mountain line for a minute,
17 I could foresee the possibility that some soil condi-
18 tions or soil pipes might result in compaction similar
19 to -- maybe not similar, but in the same line as a
20 temporary haul road, where that's going to be very
21 hard and the question there is how are you going to
22 restore that, and clearly the surface materials
23 will have to be broken up with a ripper of some form,
24 but I wouldn't predict that all of the area that will
25 be built by the winter or the conventional winter
26 technique would require such treatment.

27 WITNESS CLARK: Mr. Scott, I
28 think if you're working on the premise that there
29 is going to be heavy compaction of the soil, I think
30 that's not correct. Maybe if Mr. Gibbs were here he

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 could provide us with observations of dirt road
2 behaviour in springtime; when the road thaws it's
3 going to be a very loose impassable surface.

4 Q Well I think Mr. Dabbs
5 and I are agreed on this, ^{if} there is no compaction there
6 is no problem.

7 A Well, maybe we could
8 stop there then. I would say there would be no compact-
9 ion of that frozen soil road.

10 Q Well then I take it,
11 Mr. Dabbs, that in view of that answer you have not
12 considered what you would do if there were compaction.
13 This is not a problem you have to worry about.

14 WITNESS DABBS: In view of
15 Dr. Clark's answer, the assessment is correct. I also
16 identified what we might do in the case of both of us
17 being wrong.

18 Q All right. Well now just
19 before I -- something I would like to leave for
20 tomorrow but I want to ask you about it and so you
21 will have an opportunity to think about it. You are
22 familiar with the Pointed Mounted line, you said you've
23 been there several times.

24 A Yes I have.

25 Q And I take it that
26 you're familiar with the crossing of the Kotaneelee
27 River?

28 A Yes.

29 Q And I wonder if you could
30 tell me tomorrow how you would propose to control erosion

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 and re-vegetate that particular site.

2 A Crossing of the river
3 or the hill?

4 Q Oh, the hill. .

5 A There's quite a difference.

6 Q I ask not that **thou cast**
7 **thy seed upon the water.** .

8 (LAUGHTER)

9 A There's a difference in
10 distance, if nothing else, of a quarter of a mile.

11 Q Well, as there has been
12 some particular problems there, I'd appreciate it if
13 you could review that and tell us what your erosion
14 plan or re-vegetation plan would be in the site
15 such as that.

16 A I am quite prepared to
17 discuss this probably not to the benefit of this
18 Inquiry, because I could go on for longer than you'd
19 want to hear me, but I think it's also important to
20 realize that, at least I am advised by Mr. Williams
21 that nowhere on the proposed Arctic Gas Pipeline is
22 there a hill anywhere near approximating the Kotaneelee
23 Hill on the Pointed Mountain line, so our talk, I
24 think, would be quite enjoyable but I'm not certain
25 it would contribute an awful lot.

26 THE COMMISSIONER: Well, let
27 Mr. Scott consider that 'observation overnight, and you
28 might consider the answer you'd give, assuming he
29 persists on expanding it.

30 A Certainly.

Clark, Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 THE COMMISSIONER: So --

2 MR. MARSHALL: I gather, sir,
3 that Mr. Scott expects to go on for some time tomorrow
4 dealing with matters of terrain and that Dr. Clark
5 should be available?

6 MR. SCOTT: Well, tomorrow I
7 propose to deal with only two matters, with -- what's
8 it called -- rock mining, gravel pits, borrow sites,
9 and borrow sites in -- down near the water, flood
10 plains. Those are the only two subjects I want to
11 cover tomorrow, and I have no objection to Dr. Clark
12 being excused, if he wants to be.

13 THE COMMISSIONER: All right,
14 well there being no other objection, you're excused,
15 Dr. Clark.

16 WITNESS CLARK: Thank you.

17 (WITNESS CLARK ASIDE)

18 THE COMMISSIONER: Tomorrow
19 we'll sit at nine o'clock in the morning and sit in
20 the morning and the afternoon, and we intend -- this
21 was intended all along -- to sit Saturday morning, and
22 then we'll return on Wednesday at one in the afternoon
23 and sit Wednesday afternoon, Wednesday evening, Thurs-
24 day morning and afternoon, and Friday morning, and part
25 of Friday afternoon. The Inquiry has to go to Fort
26 Smith late next Friday, so our Friday afternoon sitting
27 next week may be limited, and since next week is a
28 short week and since everyone will be returning refreshed
29 from a weekend of rest and relaxation, we might consider
30 sitting not only Wednesday night next week but Thursday

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 night as well, depending on the feeling of the counsel
2 and the witnesses and others.

3 MR. HOLLINGWORTH: Speaking for
4 ourselves, sir, I won't be here and now that the
5 positions are reversed I'll have to volunteer Mr. Gibbs
6 to make that decision.

7 THE COMMISSIONER: Well, nine
8 o'clock in the morning then.

9 (PROCEEDINGS ADJOURNED TO NOVEMBER 7, 1975)

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AUTHOR

Mackenzie Valley pipeline inquiry:

Vol. 82 6 November 1975

DATE DUE

BORROWER'S NAME

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Government
Publications

MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF APPLICATIONS BY EACH OF
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS
CROWN LANDS WITHIN THE YUKON TERRITORY AND
THE NORTHWEST TERRITORIES, and
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY
THAT MIGHT BE GRANTED ACROSS CROWN LANDS
WITHIN THE NORTHWEST TERRITORIES,
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

November 7, 1975.

PROCEEDINGS AT INQUIRY

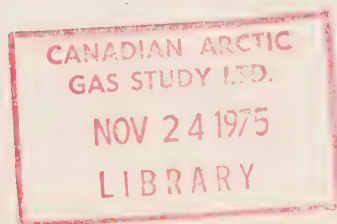
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Mr. Glen W. Bell and
Mr. Gerry Sutton for Northwest Territories
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Mr. John Bayly for Inuit Tapirisat of
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Mr. Ron Veale and
Mr. Allen Lueck for the council for the
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Mr. Carson H. Templeton for Environment Protect-
ion Board;
Mr. David Reesor for Northwest Territories
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WITNESSES FOR CANADIAN ARCTIC GAS PIPELINE LIMITED:

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Guy Leslie WILLIAMS

- Cross-Examination by Mr. Scott (cont) 12331

Dabbs, Harlan, Hemstock,
McCart, Minning, Williams
Cross-Exam by Scott

Yellowknife, N.W.T.

November 7, 1975

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. MARSHALL: Mr. Commissioner,

I have been instructed this morning that Arctic Gas has selected the cross-delta route as part of its prime route. An amendment and initial supporting materials will be filed in the next few weeks. These will include both geotechnical and environmental reports. Thank you, sir.

THE COMMISSIONER: We've all laid bets on that, one way or another.

MR. SCOTT: I think some of us did, Mr. Commissioner.

THE COMMISSIONER: Well, thank you, Mr. Marshall.

DONALD L. DABBS,
R.L. HARLAN,
R.A. HEMSTOCK,
PETER J. MCCART,
GRETCHIN V. MINNING,
GUY LESLIE WILLIAMS, resumed:

CROSS-EXAMINATION BY MR. SCOTT (CONTINUED):

Q I wonder if you could tell us this morning in summary form how you would re-vegetate the valley of Kotaneelee, the process or techniques that you'd use?

WITNESS DABBS: Just a few points. I think this is a fair example of two points that were discussed here. One is obviously the need of engineering to provide a physically stable situation.

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1 It appears or has appeared to me this wasn't really
2 the case with this particular hill. I think another
3 point to start with is that the approach we would take
4 on that particular hill with the erodibility rating as
5 we discussed it yesterday. We would take into
6 account a few more features that perhaps should have
7 been in addition to simply site moisture conditions.
8 For example, length of cross-slope and steepness of
9 cross-slope, ditch slope and cross-slope angle, just
10 to name a couple.

11
12 The approach then, to me there
13 is an obvious need for a re-direction of surface water
14 at the top of the hill into locations where it in itself
15 had not caused an erosion problem in another area. The
16 break dykes that were constructed and sandbagged on the
17 up-slope side do not appear to me to have been extended
18 far enough across that slope of that particular hill and
19 had been cut in order to construct the pipeline, and
20 the diversion dykes were not extended fully across that
21 slope, and I observed some rather severe erosion off
22 the ends of those dykes which, had they been extended
23 clear across the cut, would not have taken place.

24 In the case of the treatment
25 of, or the building of those dykes, this is clearly an
26 engineering feature, and I can make a couple of comments
27 at least that they did not appear to me to be high
28 enough, considering the size and the slope of that
29 hill and I think one of the treatments that we show
30 in our Table 2 here could have been enacted in that

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2 case very nicely or quite effectively with the
3 planting of shrub cuttings on the up-slope side of
4 some but probably not all of those breaker dykes,
5 even though this is rather sandy material, the times
6 of year that I visited there there was always adequate
7 moisture on the up-slope side of those dykes to have
8 supported this shrub growth which would have been grow-
9 ing living dyke which probably wouldn't have been
10 breached, as some of them were, with a buildup of too
11 much material. Of course the plant material to do
12 this was available in abundant supply at the bottom of
13 the hill, it's a simple and inexpensive technique.

14 I think then as a last point
15 and probably the most important point that I observed
16 there, the entire cut had not been seeded, at least
17 that was my conclusion and I was also advised by
18 the fellow from Westcoast Transmission who was with
19 us that in fact that was the case, and in this
20 particular case it had been seeded with a fixed wing
21 aircraft and this illustrates my point that in cases
22 like slopes you should go to something like a heli-
23 copter and/or/^{hand} seeding in order to get a complete
24 coverage of the entire slope, and to finish this
25 answer I would say that the seed mix and the treatment
26 specified in our Table 2, Appendix "C" for boreal
27 forest high erosion areas would have successfully
28 controlled, or contributed to the control of that erosion.
29 I think it's important to remember the need for sound
30 engineering in this case.

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2 Q Over what period of time
3 would complete re-vegetation occur, if your plan was
4 followed?

5 A I think the climatic
6 events of 1972-1973 illustrate again the point we have
7 made, that it's difficult and impossible to predict
8 those, and in '72 there had been a heavy early summer
9 rain that had washed much of the seed off of that
10 hill, resulting in a need to return to the area for
11 additional seeding. In those cases physical techniques
12 obviously have to be well enough engineered to control
13 a heavy summer rain; with a proper rainfall -- not
14 proper rainfall, adequate rainfall. At that latitude
15 I think a plant cover could be achieved in one year
16 and probably two years at the most.
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1 Q Doesn't the weather that
2 occurred there indicate that, notwithstanding the best
3 will in the world, re-vegetation cannot necessarily be
4 relied upon. I take it for example you're telling me
5 that it not only was ^{not} coast seed washed away but
6 anybody else's seed would have been washed away too
7 including yours.

8 A That's what we've been
9 saying all along. Quite true. And those types of
10 climatic events would have been taken more into
11 consideration more in the engineer's design of erosion
12 control.

13 Q Well now, we come to one
14 other matter. I take it from the specifications in
15 Appendix C that they have been developed primarily for
16 mineral soils. Is that correct?

17 A Yes.

18 Q Yes. And that however,
19 you recognize that there will be organic soils and I
20 think in your responses to the request for supplementary
21 information, you recognize that there will be that
22 requirement ^{that} and there are some problems associated with
23 promoting growth on those soils because they are cold
24 and, or it will be cold ^{they will} and low in nutrients?

25 A Yes. We certainly do
26 acknowledge the problem of re-vegetation in deep
27 organic soil.

28 Q In the same response and
29 I won't bother referring you to it in detail, you
30 outline studies that are designed to determine the

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1 bentgrass species and the fertilizer combination for
2 those particular soils. Do you recall that?
3

4 A I would like to--

5 Q You say that studies
6 are going to be done at page 32-1?

7 A Certainly I recall saving
8 that studies --

9 Q Yes. Have they been done?

10 A They are underway as I
11 identified for you yesterday.

12 Q And I take it that the
13 results have not been compiled?

14 A That's true.

15 Q Well now, can I come to
16 the matter of tundra mat removal and replacement? I
17 take it that the fundamental purpose of this technique,
18 its primary purpose, is to aid in re-vegetation of the
19 berm.

20 A The word "aid" is quite
21 appropriate, yes.

22 Q You like the word "aid", I
23 take it, because you recognize that this technique can-
24 not by itself re-vegetate the berm?

25 A That's right.

26 Q You haven't listed in
27 your specifications any particular areas or types of
28 areas where this technique will be utilized. Have you
29 given thought to the kinds of places it will be used?

30 A Yes, we certainly have.

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Q What sort of places
will tundra mat removal and replacement be a technique?

A I believe ^{least} at one point during
the discussion this week I mentioned the tests
which have been established near Tuk and the intent
there of those programs--the objective of those programs--
is to define for us just what tundra community types
would prove feasible to implement this technique.

Q Well, would it be correct
to say that the tundra mat removal and replacement is
a novel approach which is still in practical terms on
the drawing boards?

A I think that's fair enough.

Q Indeed, I take it that
from looking at the original specifications, that it
was your hope that if you could develop tundra mat
replacement techniques you wouldn't have to seed where
those were used, but that you have now come along and
recognized that, bearing in mind the state of the part
you will to seed as well.

A I think perhaps you have
slightly misinterpreted our original specifications--
either that, or I didn't make it clear in them that
stripping would be a supplement to seeding. I think I
have always contended that.

Q All right. Well now,
at the time of the filing of your application, or
Arctic Gas's application, you had a test site for this
process on a seismic line in the Yukon and since then,

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2 and that was shown, I think, as one of your slides.

3 A That's right. Yes.

4 Q And you also, since
5 that time have had a test at Tuk?

6 A The test has been initi-
7 ated. Yes.

8 Q Yes. Well now, I understand
9 that the test at Tuk was not successful?

10 A The test was only about
11 established two weeks ago. It's difficult to say--

12 Q Well, that is the second
13 test, isn't it? Wasn't there a first test in which
14 you reported that the tundra mat which was pulled from
15 the earth by a cat and put back on the earth had in
16 substance almost entirely died, dried up and died?

17 A Well yes, there was a
18 very minimal program a year ago. I don't recall that
19 that was any published or reported result. The problem
20 encountered there was one of inappropriate equipment for
21 the test.

22 Q Well, what I am getting
23 at is you've recognized the novelty of this approach and
24 I take it that the first test of it done at Tuk was
25 done in such a way that a cat pulled up the mat and it was
26 then relayed? That was the first test over the first
27 growing season, wasn't it?

28 A That was our first attempt
29 in our studies--

30 Q And whatever the reason

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2 that test was a failure. The mat didn't grow.

3 A I would say that the
4 test wasn't an entire failure, but you're quite right.
5 It wasn't--we didn't achieve the same amount of growth
6 as we would liked to have.

7 Q And I take it that you
8 concluded that one of the principle reasons why you
9 didn't achieve the growth that you anticipated was the
10 cutting technique. You needed a more refined knife-like
11 cutting of the turf than you could get with a cat.
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A Not quite Sir. I think

I think

that if I could tell you what/the problem was is simply

a

one of undersized cat using/ripper-tooth and the cat

simply can't deal with solidly frozen perma frost and

that an alternate technique would have to be found.

Q How are you getting over

this problem in the second test?

A The test was run prior to

the freezing off of the active layer, or frost/^{had}penetrated

fully to the perma frost table and at that time of year,

which in October, the, a small cat with a blade can

easily peel the tundra back.

Q Well that isn't a situation

that is likely to be duplicated in construction is it?

A Probably not, although the

actual construction techniques to be employed here

should be discussed probably with Mr. Williams.

Q Well now let me ask you

one other question? I take it from you revision that

your theory is that even if the tundra mat replacement

technique doesn't grow, that you think it will be

useful as a mulch or to provide insulation?

A Yes. This is what Dr.

Clark and Dr. Slusarchuk have advised me, that they

view that as an important contribution to the insulation.

Q What sort of concerns me

is that there seems to be some commitment to this

process and I gather, that though the tests haven't been

hope

successful to agree, you / you say well even if it

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2 won't grow, we'll find some use for it. we'll use it
3 as insulation or as mulch. Now I would like just for
4 a moment to analyze those two possibilities. What
5 native species are likely to be promoted by this mulch?
6 Let me put this proposition to you. So far it appears
7 clear from the tests, that you cannot, with the desired
8 degree of success, count on the replacement of tundra
9 to vegetate the berm. Maybe your next test or your
10 current test will have better results but at the
11 moment you couldn't count on that. Isn't that correct?

12 A. At the moment and in the
13 light of our very recent program, I think. I feel the
14 technique has real merit and we have stated that, that
15 is only, is our approach at this point in time, that
16 we still have reason to believe that there is real
17 merit to this.

18 Q Well, let me put this
19 proposition to it. If you should use it and it should
20 happen as happened at Tuk. that the bulk of it dries
21 up and dies when it is on the berm, how is that going
22 to advance the growth of seeds of native species that
23 have been planted there?

24 A Well, organic materials as
25 we are discussing is a very important, and is very
26 important in the retention of moisture. That effect
27 I think in itself/will assist in the promotion of growth. The
28 seeds however that fall directly into a clod of dead
29 organic material is not likely to germinate. I think
30 anyone that has done any of this kind of work has seen

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2 that.

3 Q Well I suggest to you Mr.
4 Dabbs that the placement of this material, assuming for
5 the moment it ends up as mulch, is not going to advance
6 the revegetation of seeds or plants in the mineral
7 soils underneath it and may indeed retard revegetation.

8 A Using your proposition.
9 I would agree.

10 Q You wouldn't what?

11 A I would agree.

12 Q Yes. Well now let's take
13 the other thing. Insulation. What are you going to
14 insulate if this desiccated material dies as it did
15 at the, in the first test at Tuk. what insulation value
16 is going to be achieved by placing it on the berm? What
17 are you insulating against what?

18 A An assistance that's all
19 to the retarded degradation within the backfill mound.

20 Q Well is it then to not
21 really to be insulation, but is to be a kind of control
22 that will prevent drainage on the berm?

23 A I don't understand your---

24 Q Well, your second reason,
25 you say, well even if it dies it will be good insulation.
26 I am not clear what you insulating.

27 A The backfill material over
28 the pipes.

29 Q From what. Insulation as
30 I understand it is something to keep in heat, or to keep

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1
2 out cold.

3 A Insulation to keep out
4 heat if you wish during the thaw season to assist in
5 reducing the depth of thaw and the backfill material
6 particularly, I would think, during the time of, while
7 the pipe is yet not active. .

8 Q Well, that is going to
9 keep the berm colder than it would be if the material
10 wasn't there. Is that right?

11 A Somewhat.

12 Q Yes, but how is that going
13 to promote growth? You want it warm. The seeds and
14 the plants are going to grow better if it is warm. I
15 don't want to take you back to my garden for long, but
16 surely that's clear isn't it?

17 A I don't believe that that
18 is a problem, sir I think that the dark surface, that
19 the surface temperatures / ^{will be} quite adequate for the
20 germination of any seed.

21 Q Well then wouldn't you
22 agree that, whatever someone else might say, it is not
23 prudent at this stage to look at this process as
24 providing any useful insulative effect that is desirable
25 in terms of revegetating the berm?
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1 Dr. Clark might want it there for some other purpose
2 of his own but it's not going to serve any purpose of
3 yours.

4 WITNESS DABBS: Well, I think
5 our purposes are pretty much the same as Dr. Clark's,
6 being control of erosion in any form.

7 Q Yes, but it's not going
8 to help anything grow there. If it doesn't grow
9 itself, it's not going to help anything grow there,
10 is it?

11 WITNESS WILLIAMS: Based on
12 your assumption that native material-- native plants
13 will be put back on the soil, they're going to die and
14 I don't think that we're ready to accept that, Mr.
15 Scott.

16 Q Well, I'm basing it on
17 the first experiment plot in which that substantially
18 occurred. I hope that your future experiments will
19 be more successful.

20 A It wasn't the case on
21 the seismic cut, though.

22 Q No, but I understand
23 the experiment at Tuk, and I think Mr. Dabbs has
24 confirmed this, was -- could not be regarded as
25 successful.

26 A Because of the inadequate
27 equipment to conduct the test.

28 Q Well, for whatever
29 reason, the single experiment that was tried at Tuk
30 has failed.

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1 THE COMMISSIONER: Putting
2 it at its best from Mr. Dabbs' point of view, as I
3 understand it, it is as if there had been no experi-
4 ment. He says it failed because the equipment chosen
5 was the wrong equipment. Isn't that what --

6 WITNESS DABBS: That's what
7 I said and tried to make a point of.

8 Q So we still don't know
9 if the technique will work.

10 A I think, sir, that the
11 seismic experiment near the Firth River has indicated
12 that the technique will work in that type of plant
13 tundra community. We do not know, and here again it's
14 important, that there are many other types of tundra
15 communities as experienced in the Tuk region, a
16 shrub tundra community, for example, where we do not
17 know if the technique will be used. Surely that is
18 the intent of our program.

19 MR. SCOTT: Q Well, Mr. Dabbs,
20 I think really what I'm saying is this, that based
21 on your present knowledge and your present experimenta-
22 tion there is no assurance that this technique will
23 work and there is some prospect that piling material
24 that may die on the berm will handicap your more
25 traditional approach.

26 A O.K., your statement has
27 a couple of parts to it and in the first case I don't
28 agree with you that we don't know that it can't be
29 done, can't be achieved. In the case of a tussock
30 cotton grass community we have all the evidence that

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1 I need to be certain that it will in fact work; but there
2 are other areas, quite true, where we do not know if
3 it will work and yes, if all we do is pile a lot of
4 organic material up there it will in fact impair the
5 germination and establishment of grass by seeding.
6

7 Q What I'm saying to you
8 is that if you don't get better results than you've
9 got now -- and this is no personal criticism or
10 criticism of Arctic Gas -- wouldn't you be better off
11 to abandon this scheme and do it the traditional way?
12 I want things to grow on this berm, and I'm saying to
13 you ^{that} if you don't get better results than you've been
14 able to get so far, aren't you better off to use the
15 traditional way and concentrate on it?

16 A Not in the areas that
17 we have established and know that it will work, those
18 being the ones I've identified. If the tests currently
19 under way show that in other tundra community types
20 it is not worthwhile, either biologically or economic-
21 ally, being far too expensive for the minimum value
22 we'd get from it, surely I quite agree that we would
23 abandon it, to use your terms.

24 Q You would agree with
25 me that once commitment to a novel scheme should not
26 be allowed to stand in the way of the evidence and
27 if it isn't going to work, you should just back off
28 that technique and go the traditional route.

29 A I think that's our
30 position and it has been. Nowhere have we specified the
use of this technique in tundra community types where

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1 we don't know it will work. We are agreed, sir, I
2 think, in we're talking in circles.

3 Q Well, you would agree
4 with me that you don't know enough to specify its
5 use on any particular kind of site?

6 A No, we know that it will
7 work in one particular type of tundra community, and
8 I would propose to use it in those areas. We do not
9 have experimental evidence to prove that it can or
10 should be used in any other areas.

11 Q The one area where you
12 know it will work is in the cotton grass tussock areas.

13 A Yes.

14 Q How much of that is there
15 on this route?

16 A From the Yukon border
17 to the delta, and of course without sitting down for
18 many hours with air photos and alignment sheets, this
19 is strictly a guess.

20 Q Do they grow on mineral
21 or organic soils?

22 A Can I finish your first
23 question?

24 Q Sorry, yes.

25 A I would estimate there
26 is something in the order of 50 to maybe 70 miles of
27 that, simply because my estimate is based on having
28 flown it, but not having counted the number of miles,
29 but knowing the type of terrain in the area through
30 which the line runs across the Northern Yukon.

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There are some areas along the laterals south from Richards Island, but very few. Most of the Tuk Peninsula and in that area ^{between} Inuvik and Tuk is generally or broadly speaking a shrub tundra area and at this point in time we have not proposed to use this technique in those areas until we can determine its feasibility.

Now you asked another question
and I have forgotten it.

Q Do they grow on organic or mineral soils? The tussocks.

A It's difficult to create a cut-off point where the tussocks, whether they actually grow in a/^{bed}mineral soil beneath them or whether they root directly into the mineral soil; but I have found that they root directly into mineral soil.

Q Now I would like to turn to the subject of borrow pits, and I'd like to begin by asking Mr. Hemstock some general questions about the impact of borrow pits, or as one of my associates refers to them, rock mines; and Mr. Hemstock, perhaps the way we can proceed is I can ask you if this is a list of the potential undesirable impacts related to the existence of borrow pits and you can tell me if you agree or not. I've listed seven possible undesirable impacts, and we can go through them one by one.

First of all, is the use of resources that may be in short supply.

WITNESS HEMSTOCK: That's correct.

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1 Q The second is the pre-
2 emptation of land and potential land use conflicts by
3 which I mean that borrow pits potentially involve
4 conflict with land uses that may be made, or may
5 desire to be made by communities, recreation facilities,
6 park areas, archaeological sites and so on.

7 A Yes.

8 Q The third is the visual
9 or aesthetic disturbances that may be perceived in
10 connection with borrow pits.
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A Yes.

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Q The fourth is terrain
disturbance that may occur in correction with borrow
pits including vegetation destruction and drainage
changes of both surface and ground water.

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A Yes. And that is partly,
of course, associated with two.

9

10

Which is a pre-emption
of the land?

11

12

Q. Right.

13

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The fifth is a disturbance
by location of the borrow pit of aquatic habitat and
fish?

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A Yes.

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Q The sixth is disruption
or disturbance of habitat for animals or birds and I
am thinking of dens and nesting areas and that sort of
thing?

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A Yes.

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Q And the seventh is the
disturbance of animals or birds by the noise of the
operation?

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A Animals or birds or
people.

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Q Or people. People are
phase four for the moment. Well now, I take it that
those are the potential undesirable impacts that have--
undesirable environmental impacts--that have occurred
to us in connection with borrow pit operations and I

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1 wonder at this moment if any others occur to you,
2 apart from the ones I have listed?

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4 A No, I think those are the
5 certainly the primary ones that come to mind.

6 Q Yes. Well now, let me
7 look at it from a slightly different way. I'm led to
8 believe that good borrow pits have attributes or
9 characteristics that not uncommonly make them attractive
10 for other purposes, or sensitive for other reasons and
11 I would just like to list these and see if I have your
12 general agreement. The first is the kind of material
13 that it is desired to borrow. That is, relatively dry,
14 loose, unfrozen material is good for animal denning.

15 A Well, very generally, it--
16 Yes, that's right.

17 Q What I am trying to--

18 A There are obviously kinds
19 of borrow that are not good to den in too.

20 Q I understand that, but
21 what I am trying to list here is the kinds of competi-
22 tion Arctic Gas is going to have for these sites and
23 I take it because of the nature of the material that
24 is borrowed you frequently come into competition or
25 may come into competition with animals who are looking
26 for denning sites?

27 A That's correct.

28 Q In the same way, I take
29 it, gravel pit areas are not infrequently--we had an
30 example the other day--regarded by people as suitable

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1 recreation areas. They are inclined to be dry. They
2 are sometimes to be high and have attractive attributes
3 for people for recreation areas.

4 A I thought they were
5 referring to me. They called it Old Baldy but anyway
6 that is quite right.

7 Q How do you know they
8 weren't?

9 THE COMMISSIONER: What--do you
10 mean they are attractive to people before or after they
11 are committed to use as gravel pits?

12 Q I think I was referring to
13 before and we will hear about after later, Mr. Commis-
14 sioner but I take it that, for example, quite often
15 near a community a place known as the look-out or as
16 a picnic area will turn out to be a place that is highly
17 suitable for a gravel pit operation. And you have that
18 kind of competition?

19 A That's right.

20 Q Yes. In the same way, I
21 take it that you have competition from the archaeologists
22 because often a good archaeological dig is likely to
23 be a good gravel pit site.

24 A Yes, that occasionally
25 happens.

26 Q Yes. Now, in terms of
27 people, I take it that places that are good gravel pit
28 locations are often places that are good for the
29 establishment of human resources such as towns, houses,
30 airfields and so on.

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1
2 A Yes, that's correct although
3 it's amazing how often towns are located in the very
4 worst places rather than in the good places.

5 Q Yes, but let me take an
6 example. I take it that one of the reasons for the
7 shortage of gravel around Inuvik is that the town of
8 Inuvik is built on the best gravel pit in the area or the
9 best potential gravel site. The hospital, for example,
10 is on an ideal gravel pit.

11 A Yes, although that site
12 was located after, with the gravel being one of the
13 major criteria in the location of the town.

14 Q Well, I understand that
15 and we're not going to criticize anybody for choosing
16 that particular site at this hearing but I'm simply
17 saying that this is another competitive factor that
18 people who want to build things often consider building
19 them in the same kind of locale that you would find
20 a good gravel pit right underneath?

21 A That's right.

22 MR. MARSHALL: At least in
23 your one example, Mr. Scott.

24 MR. SCOTT: Well, there will be others.

25 THE COMMISSIONER: I wish he
26 hadn't said that.

27 MR. SCOTT: Q I thought I had you under
28 control this morning, Mr. Commissioner.

29 The next thing is, I
30 understand that gravel pits are frequently found in

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 valleys where a number of conflicting problems meet
2 and join. A valley, we know, is inclined to be a sensi-
3 tive environmental area and gravel pits are frequently
4 found at the juxtaposition of those sensitivities.
5 At the interface of those sensitivities.
6

7 A I have a little more
8 problem with that. I suppose that does happen but I
9 can't see that that is a particular criteria or occurs
10 particularly often.

11 Q Right and last, I take
12 it that hard rock sites are frequently adjacent to
13 cliffs which are used by raptors and other birds.

14 A Yes.

15 Q Yes.

16 THE COMMISSIONER: Excuse me.
17 You are all going to hate me for this but I have
18 forgotten what a raptor is. What--is it an eagle or
19 a hawk or--?

20 MR. MARSHALL: We haven't got
21 into phase three yet, sir. You are forgiven.

22 Q And indeed, at Norman
23 Wells, for example, near the municipal or one of the
24 municipal gravel pits. There's a raptor nest and the
25 gravel operation is getting closer and closer to it
26 and everybody is beginning to get terribly excited. You
27 know that, don't you?

28 A How about the bird? Is
29 he excited yet?

30 Q You'll pardon the pun.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 The bird has not yet been pulled. That is a common
3 competition for this particular kind of resource place,
4 isn't it?

5 A That's right. Yes.

6 Q Well now, I would like
7 to come on to borrow resources and Miss Minning, I
8 have a couple questions for you in this area. Really
9 to find out what precisely has happened as you have
10 planned the borrow locations for this project. Now,
11 there was some talk earlier in Mr. Bayly's examination
12 of the conservation of resources and the necessity to
13 make allowance for competing demands but I take it that
14 what Arctic Gas has done and I don't make any criticism
15 of this is that it has selected and shown on its maps
16 the best available sites to meet its own needs at the
17 lowest cost.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 The government may tell you you can't have them, but
2 that's what you've done and you've selected the best
3 for your own purposes at the most reasonable cost.

4 WITNESS MINNING: We have
5 also shown alternative sites when possible in case
6 there is some question of a choice of sites.

7 Q But what I'm trying --
8 sorry.

9 A And we have not all
10 asked totally for No. 1 material. We have given other
11 No. 1, No. 2, No. 3 needs, not totally No. 1. In
12 other words, we're not going to build something out
13 of all gravel if it's not necessary.

14 Q Have you left out any
15 sites because it was No. 1 material?

16 A I don't know if I quite
17 understand that.

18 Q Well, at locations
19 where you've said, "Well, we won't choose that because
20 it's No. 1 material. We'll instead choose this, it's
21 No. 3. We'd rather have No. 1 material but we'll
22 choose No. 3."

23 THE COMMISSIONER: Because of
24 environmental considerations, have you said to yourselves
25 "Well, that's No. 1 and this is No. 3, but because of
26 environmental considerations we'll reject No. 1 and
27 use No. 3 because it is not going to do as much harm,
28 there isn't as much risk." Or have you opted normally
29 for No. 1?

30 A Well, in the example of

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 the Mackenzie River Valley, we purposely stayed out
2 of gravel deposits on the west side of the Mackenzie
3 that are in flood plains, this sort of thing.

4 Q And you stayed out of
5 the gravel bars on the Mackenzie.

6 A That's correct.

7 Q I thought you said that
8 they weren't any good anyway.

9 A No, on the west side of
10 the Mackenzie there are some borrow sites that might
11 be good, which could be barged across or taken across.

12 MR. SCOTT: Q. But Miss Minning,
13 on the west of the Mackenzie you've stayed out of
14 there for environmental reasons. Isn't that so?

15 A Out of the river deposits,
16 yes.

17 Q Yes. What I want to talk
18 about is resource reasons for the moment, and there
19 was a good deal of talk earlier about competition for
20 these resources, and Arctic Gas recognizes that the
21 approval or refusal to approve the quarries will be
22 the responsibility of the government or some other
23 agency. What I am saying to you is that your prefer-
24 red selections are your first choices, having regard
25 to what you want at the most economical cost. If you
26 can't get them, you may have to go to some other
27 selection, but they're your first choice.

28 A That is correct.

29 Q So that in pin-pointing
30 your first choices, you have quite properly at this

Dabbs, Harlan, Hemstock
McCart, Mining, Williams
Cross-Exam by Scott

1 stage had no regard to the competition for that re-
2 source. That's the responsibility of government.

3 A Yes.

4 Q In short, the sites that
5 are your preferred sites are ones that you have selected
6 for your purposes, not adjusted because someone may
7 say later, "Well, you can't have that, there isn't
8 enough," or "We don't want you to have it."

9 A That's correct.

10 Q Yes. Well now, just
11 let's see if I can trace the history, because of the
12 competition for this resource the government, which
13 issues the permits has been trying to find out what
14 the volume of the resource is, and where shortages
15 may occur; and you're aware of that ongoing process?

16 A Yes.

17 Q And to do that they have
18 conducted what they call a Mackenzie Valley granular
19 materials inventory.

20 A That's correct.

21 Q Yes, and that's a survey
22 of the sources and quantities of certain kinds, certain
23 classifications of borrow material to be found in the
24 valley.

25 A That is correct.

26 Q And I think they've
27 divided it into three classifications, essentially
28 comprising the better kinds of granular materials.

29 A That's correct. Actually
30 there are five classifications, I think.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q All right, and that
2 granular survey, which is I think an exhibit here, cov-
3 ers generally the route from Richards Island to Fort
4 Simpson.

5 A There are certain parts
6 of the route that are not covered by the granular
7 material inventory.

8 Q From Richards Island to
9 Fort Simpson?

10 A That's correct.

11 Q Is it intended, as far
12 as you know, to complete that inventory?

13 A I do not know.

14 Q All right. Well are you
15 telling us that the Fort Simpson realignment is outside
16 the granular survey?

17 A I would say that the prime
18 route that was filed is outside of it, too. The
19 granular materials survey stop at Fort Simpson.

20 Q Well, that's what we said.
21 Between Richards Island and Fort Simpson, leaving
22 aside the Fort Simpson amendment, the survey covers
23 the area in which you will be looking for gravel.

24 A Yes, except I'm saying
25 that whether the amendment or the other routing, it
26 doesn't matter, it didn't go further south than Fort
27 Simpson.

28 Q That's what I say, from
29 Richards Island to Fort Simpson. Are we together now?

30 A I don't know.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q Well, the government's
2 granular survey covers this route from Richards Island
3 to Fort Simpson.

4 A The inventory stops
5 short of Richards Island.

6 Q How much short of Richards
7 Island?

8 A Just a moment.

9 Q Well, don't tell me
10 precisely, just give it to me generally.

11 A I think it was -- I'm
12 not positive. I don't want to say without looking at
13 my notes.

14 Q All right, well let me
15 ask you this, dealing with the area just short of
16 Richards Island, if you want, and down to but not beyond
17 Fort Simpson, the government granular survey pretty
18 well covers the area which you will be seeking to
19 obtain this resource.

20 A That's correct.

21 Q Well now, that's the
22 resource survey. Now in addition to that, in order
23 to find the competing demand, the government has been
24 doing a survey of the requirement and they have asked
25 a number of persons -- the highway people, Arctic
26 Gas and perhaps others -- to give estimates of their
27 need.

28 A That's correct.

29 Q And you've participated,
30 or Arctic Gas has participated in that exercise.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 A That's correct.

2 Q And you indicate, I
3 think, in one of the answers to the Assessment Group
4 the information that you gave to DIAND as part of
5 that survey of need?

6 A That's correct.

7 Q And summarizing it,
8 the information that you provided to DIAND was -- had
9 two characteristics, the kinds of material you required
10 and the volumes you required it in.

11 A That's correct.

12 Q And I take it that
13 Arctic Gas understands that this information is given
14 for the purpose of attempting to allocate the resource
15 ultimately as between the potential users.

16 A That's correct.

17 Q Well now, I just want
18 to deal again with something that you discussed with
19 Mr. Bayly in this way. In selecting your proposed
20 pits you've concentrated, I take it, on the better
21 grades of granular material, that is the DIAND
22 classifications 1 through 3. The key word is "concentrated".

23 A Yes.

24 Q Yes, and these are basi-
25 cally gravels and sandy gravels and maybe some coarser
26 sandy gravels, or coarser sands, I'm sorry.

27 A That's correct.

28 Q But you have also in
29 addition, selected some bedrock sites and a few sites
30 on glacial till.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 A That's correct.

2 Q But no sites in silt or in
3 clay.

4 A I think that some of the
5 sand in some of these sites is fine sand, which is
6 almost as fine as silt or clay.

7 Q And repeating again, if
8 I may, The selections that you have made of these
9 materials are either what you want or the best that
10 you can get at a reasonable distance.

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Dabbs Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

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A Right.

Q Now in answer to Mr.

Bayly, you indicated that lower grade materials could be substituted for some purposes if for any reason you cannot get the material that you have chosen.

A That's right.

Q So that it follows that perhaps you could use, in certain locations and for certain objectives, you could use less gravel and more sandy material, as you discussed with Mr. Bayly, or more bedrock material?

A That's correct.

Q Or more till?

A That's correct, if the till is not high ice content.

Q Yes. And you would be familiar for example, with the, the parts of the Mackenzie Highway between Fort Simpson and the River Between Two Mountains, where, where sub-grade materials have been used in building the highway.

A That's correct.

Q Largely till and sand and even some silt?

A Right.

Q Indeed, the pit that Mr. Justice Berger asked you about before lunch yesterday--

A Is probably in till.

Q -- is a till pit, isn't it?

Dabbs. Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

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A Yes.

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Q And what has been done on
the highway in certain sections, in the section I
described, is subgrade materials have been used at the
bottom of the highway with a gravel covering limited
to the surface.

8

9

A That's correct.

10

11

Q Yes. And the same sort
of process has been used on the highway between Inuvik
and Arctic Red.

12

13

A. That's correct.

14

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17

18

Q Yes. In that case a lot
of shale has been used at the base of the highway with
gravel restricted only^{to} the surface. Now, I take
it in addition to utilizing, what I have been referring
to a substandard materials, you can also upgrade some
materials by screening and crushing and washing?

19

20

A That's correct.

21

22

Q Well now, in answering Mr.
Bayly, you made reference to some areas of potential
shortage---

23

24

A I never got to finish that
list.

25

26

Q I beg your pardon? I beg
your pardon?

27

28

A I said there were more
things I never was finished reading ^{the} list at that time.

29

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Q Of areas of potential
shortage?

Dabbs, Harlan, Hemstock.
McCart, Minning, Williams.
Cross-Exam by Scott

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A That's right. He was only

interested in

Q Well I know that. He has
a very narrow view of the function of this inquiry and
seems to be restricted to the North. I may have a
broader concern. I am coming to that. You mentioned
to him Richards Island, east of the delta.

A That's correct.

Q The PAAG Report mentions
some other areas of potential shortage as well and
perhaps you can complete for us the list of areas of
potential shortage.

A If I can find my piece of
paper again.

Q Oh, Miss Minning, you are
familiar with the list of areas of potential shortage
that are listed in the PAAG Report?

A Yes.

Q Do you disagree with any
of those?

A No.

Q No. Do you have some to add?
I should let you find your list.

A Just let me find my list.

Q All right.

A In addition to miles
0 to 172, miles 297 to 310 miles 357 to 376. miles 420 to
490, There is some discussion about this area, 507-
to 533. There is bedrock in the area so it is probably
has a shortage of certain things. And miles 605 to 820.

Dabbs, Harlan. Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 but I might add in that stretch that alot of till is
3 available as in the Mackenzie Highway, but good gravel
4 is scarce in that stretch.

5 Q Is the last one 605 - 820
6 on the Fort Simpson route change?

7 A Yes.

8 Q Yes. Well now, are there
9 any others?

10 A There might be some
11 shorter stretches in there that I have missed but I
12 think those are the main areas.

13 Q Well now Dr. Fyles your
14 old mentor, tells me that nobody knows more about gravel
15 locations in the Mackenzie Valley than you.

16 A I'm sure he does.

17 Q Well he said it: I just
18 take it and leave it there. I take it that all those
19 areas that you have described are areas of potential
20 shortage if you are concerned with classifications one
21 through three?

22 A Yes.

23 Q Yes, and when you said
24 there was bedrock and there was other things what you
25 are really saying is that there are other ways that
26 we can supplement the supply by using lesser grade
27 materials?

28 A That's correct.

29 Q Well I wonder if I could
30 ask you to comment generally on the overall supply
question. You have given us these mileages in which

Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

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there are areas of potential shortage. How do you see the overall supply question. Are these likely to be critical areas in terms of supply?

5

6

A Critical areas, you mean, if there is a railroad built? Yes.

7

8

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12

13

Q I haven't added them up but you have listed several miles of the route in which there are areas of potential supply problems. I wonder how you would characterize that in the overall supply picture? Are those critical areas in terms of the presence of communities and other potential developments of which you have knowledge?

14

15

A Yes I guess there is a problem.

16

17

18

19

Q Now, I take it that the way to resolve the problem in these critical areas is really to substitute subgrade materials to materials of choice?

20

21

22

A Yes.

Q Lower grade materials in place of prime materials?

23

24

A Yes.

25

26

Q Now if that is done. will that do the trick? Or will there still be areas of critical shortage, critical potential shortage?

27

28

29

30

A Well, take the Fort Simpson area, for example, if you have, there is not very much gravel there, so no matter what you do you are always going to be short there.

Dabbs, Harlan, Hemstock.
McCart, Minning, Williams.
Cross-Exam by Scott

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Q Well I take it what your saying is that even if you go to substandard to lower grades in that area, there is, there will always be a potential critical problem in terms of grades one through three?

A That's correct.

Q Are there other areas like that on the list that you gave us?

A Yes.

Q And what, which are they?

A I would say the Northern end of the pipeline is that way.

Q Yes.

A From 0 to 172.

Q Yes. Now in the PAAG Report, I don't know that you need to look at it, but it is on page 360 if you have it handy. Have you found the page?

A Yes.

Q And your dealing there with the problem of gravel shortage, or they are dealing there with the problem of gravel shortages at the North end that you have just described and in the paragraph under industrial development, do you see that, they say in the third sentence, "In comparison, direct use of granular materials for the pipeline is modest", that is in comparison to the producers requirements, "is modest and will not appreciably reduce the local supply of borrow materials available for gas production facilities

Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 and other industrial uses". Now that was, I take it,
3 PAAG giving a plus to that particular situation. What
4 I want to ask you is, in view of the cross-delta route,
5 I take it that it is clear that there will be now a
6 much greater demand for gravel?

7 A Yes. I think that is
8 correct.

9 Q Yes. Is there any way
10 at this stage, of computing the additional demand that
11 the cross-delta proposal will impose?

12 A Do you want to know how
13 much in terms of material required? Is that what you
14 are asking me, or will there be pressure on the East
15 end and the West end, yes. There is no gravel in the
16 delta. The deposits on the East side of the delta and
17 the deposits on the West side of the delta would have
18 to be used to build across delta rock.

19 Q Can you place any volume
20 on your requirements? On the East end? If you want
21 to do it later and give it to us, through your counsel
22 will be satisfactory.

23 A Yes.

24 Q I take it that it is
25 apparent that the cross delta, the cross delta route is
26 going to markedly increase the requirement of gravel in
27 an area of critical supply?

28 A Yes.

29 Q Yes.
30

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q Well, let me ask you
2 something else about this. In the Assessment Group
3 Report they identified some of your pit locations as
4 being near communities in which there was a poten-
5 tial demand -- competition for demand. Have you
6 reviewed their comments in this regard?

7 A Yes.

8 Q Do you agree with them?

9 A Yes.

10 Q I take it for example
11 that at Inuvik first of all, Inuvik is a place where
12 there is a potential critical supply problem.

13 A That's correct.

14 Q Yes, and I take it that
15 at Inuvik your preferred gravel location is in fact
16 the town gravel pit.

17 A That is right.

18 Q And that's the same at
19 Norman Wells, isn't it?

20 A Yes, but a quarry, there's
21 a lot of material in that quarry and that's a long
22 long ridge of bedrock.

23 Q I'm sure there is. I'm
24 simply getting -- I'm not asking you at the moment
25 whether it's critical at Norman Wells, I'm simply
26 asking whether you have chosen as your preferred loca-
27 tion the location that is in essence the community
28 quarry?

29 A Yes.

30 Q Well now, in view of the

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Assessment Group's Report, have you in any way altered
2 the choices that you have made for gravel location, or
3 is that a process that is under way?

4 A I think that's a process
5 that is under way now.

6 Q But can we take it that
7 at the moment there have been no changes in selection
8 made about which you can notify us?

9 A That's correct, yes.

10 Q Is that --

11 A In Inuvik we have a
12 different idea there, I think we've made a change at
13 Inuvik in particular.

14 Q Well, let me put it this
15 way. Have you announced the change? In other words
16 all we have to go from is the alignment sheets and
17 what you tell us.

18 A That's right.

19 Q I take it that no
20 changes have been made in the alignment sheets or the
21 routes --

22 A No, I don't think there
23 has been any change in the route sheet, no.

24 Q Do I understand that you
25 have under way a process of review whereby you may
26 alter the selection of your preferred or alternative
27 sites?

28 A Yes, I think so

29 Q Yes. Do you know when
30 that will be completed?

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 A I said that would be
2 completed after we finish writing up the work of this
3 summer.

4 Q May I dare to ask when
5 that's likely to be?

6 A No, don't ask.

7 MR. MARSHALL: You could help.

8 MR. SCOTT: Well, I'm concerned
9 to know when we may get some further information on
10 this. If you could place in general terms your optimum
11 report date before us?

12 A Well, we were hoping to
13 get this report done by January, so I would imagine
14 sometime in the vicinity of January you'll get this.

15 Q Well now, I'd like to
16 -- because these matters were postponed from Phase 1,
17 I would like to ask you and Mr. Williams to review a
18 borrow pit operation in particular, to take a particular
19 site and review it with us so I will understand exactly
20 what's at stake and the one I'd like to look at is
21 compressor site MO-4, which is at Thunder River.

22 A This is a bad one.

23 Q It's alignment sheet
24 drawing 1-B-0200-1005, and I think we've given you that
25 and perhaps you've had a chance to get it out.

26 A I wish you'd given us a
27 site that was slightly better.

28 Q Well, I seem to be doing
29 all right this morning. Is better in what way?
30 Why have I chosen an unfortunate site?

1 A This is one of the sites
2 that was commented on by the Pipeline Assessment Group.

9 MR. MARSHALL: Can we have the
10 drawing number again?

16 The first thing that I'd like
17 to get in my mind to clarify ^{it} for myself is this. I've
18 thought of a compressor station, as we've gone through
19 these hearings, as a pad with a compressor on it
20 somewhere out in the wilderness surrounded by trees,
21 and I've thought of a gravel pit as something like the
22 same situation, a hole in the ground or a cut in a
23 stone wall existing in isolation in the countryside.
24 Now, this, I take it, this compressor situation, this
25 compressor location at Thunder River is not untypical
26 of compressor station sites throughout the valley in
27 terms of resources and facilities.

30 Q And just so we'll have it,

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 it first of all has a compressor station, a 6,000-foot
2 airstrip, seven miles of permanent all-weather road,
3 a wharf, a materials stockpile site, and a communications
4 tower.

5 A Yes sir.

6 Q And the permanent road
7 appears to involve one crossing^{of} a perennial stream, is
8 that correct?

9 A Yes sir.

10 Q And the stockpile site
11 will be located, as I understand your previous evidence,
12 on the gravel pad which ultimately supports the compres-
13 sor station.

14 A Yes.

15 MR. SCOTT: Mr. Commissioner,
16 since
17 /I'm going to ask some specific questions about these
18 things, perhaps I could ask Dr. Fyles to show you the
19 location of these items and any other counsel that wants
20 to see them on your map.

21 Q While Dr. Fyles is up
22 there, do I understand correctly that there are, first
23 of all, do I understand correctly that the proposed
24 highway line is shown on the alignment sheet to the
25 right? It's a dotted or a dashed line.

26 A Yes sir.

27 Q Yes, and that you have
28 shown on this map four borrow locations, or is it
29 three?

30 WITNESS MINNING: There's two.

Q Looking at the alignment

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 sheets, one is shown just to the right side of the
2 river south-west of the compressor station with a
3 circle at that cross-line, is that correct?

4 WITNESS WILLIAMS: Yes.

5 Q And the other is shown
6 on the alignment sheet to the right, just adjacent
7 to the air strip.

8 A Yes.

9 Q And I take it that there
10 are two gravel pit areas that are adjacent to the
11 highway. They are shown on the route map, I think,
12 as MP-180, Pit 300.

13 A That's shown as an
14 alternative site, yes.

15 Q That actually is two
16 sites, isn't it, that is shown as one because they're
17 very close together? Well, we'll leave it at one,
18 I'm not troubled by it. Now the purpose of this
19 exercise, if I may say so, is to see how we can conserve
20 gravel of prime grades, so
21 that other competing uses in the neighborhood may have
22 a fair crack at it as well. Now, on the route map you
23 have listed your borrow requirements for the airstrip,
24 the pad, the road, and so on, and to summarize it I take
25 it that you are going to require something over two
26 million cubic yards of borrow material to construct
27 all these facilities.

28 MR. MARSHALL: What's that the
29 total for?

30 MR. SCOTT: Well, let's take

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 them individually. The air strip is by far the largest
2 and that's about 960,000, as shown on your route.

3 A Yes.

4 Q The compressor station
5 is 570,000 cubic yards.

6 A Right.

7 Q The road is 350,000.

8 A Yes.

9 Q And the wharf is 145,000.

10 A Right.

11 Q So you're using roughly
12 in excess of two million cubic yards.

13 A About two million yards,
14 yes.

15 Q And just for the record
16 I take it that at these locations the borrow and fill
17 operation will be carried out in the summer.

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Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 A No, it doesn't say that.

3 Q I know it doesn't say that
4 on the route map, but I think in the table in the
5 responses you indicated that. Is there any doubt about
6 that, or is it simply that you don't recall? Looking
7 in the responses -- well, perhaps I should show it to
8 you.

9 WITNESS MINNING: Yes.

10 Q Well now, can you tell
11 us the classification, the DIAND classification of
12 the gravel in the three pits you're talking about, or
13 in the three sites?

14 A I would like to look at
15 the DIAND map before I would say what DIAND put as
16 the number on there. There is a map, I think, that's
17 probably part of the hearings.

18 Q Well, let's just reserve
19 that then for later and move onto something else.
20 Let's deal with the compressor station in which you're
21 going to need 570,000 cubic yards of material. Now,
22 what sort of material are you going to use to build
23 this pad?

24 WITNESS WILLIAMS: Well, Miss
25 Minning tells me that this is pretty poor material
26 at this site, Mr. Scott, so this would be an area
27 where you would use a poorer material in the core of
28 the airstrip, or the pad, or the roads and try to
29 conserve the better material for a dressing; or if
30 there is no suitable material for a dressing, then

Dabbs, Harlan, Hemstock
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Cross-Exam by Scott

1 we would possibly have to bring it in from somewhere
2 else.

3 Q Yes. Miss Minning has
4 also told us that this location is within one of the
5 areas of critical potential supply, this is Milepost -
6 whatever it is - is within the range that she gave us
7 and which the Assessment Group gave us. The problem
8 that confronts us is until we know the minimum require-
9 ments for construction that Arctic Gas has, it is
10 impossible to allocate the supply that exists. Do you
11 follow the problem I'm raising? Until we know the
12 minimum quality that Arctic Gas needs in this two
13 million cubic yards, it's virtually impossible to
14 make any realistic allocation of resources as between
15 Arctic Gas and subsequent or contemporaneous users.
16 Now the first question- You see that problem, Mr.
17 Williams?

18 A Yes sir.

19 Q The first question is,
20 when will we know the minimum requirements, in terms of
21 quality that Arctic Gas has?

22 MR. MARSHALL: Are you talking
23 about the government, or you as Commission counsel?

24 MR. SCOTT: Well, I may want
25 some gravel. I'm talking about me as Commission counsel
26 at the moment. The problem is that Arctic Gas has
27 told us the volumes they will require of material. I
28 take it nowhere in your application have you told us
29 the quality of material that you can put up with to
30 build the resources you need, to build the facilities

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 you need.

2 WITNESS MINNING: I think some
3 of this information was sent to DIAND when the Class 1,
4 Class 2, Class 3 were discussed.

5 Q Well, what I'm getting
6 at is this. Mr. Williams, I take it before you let
7 the contract to build -- when you let the contract
8 to build the compressor station pad, you're not going
9 to say to the contractor, "Well, just use whatever is
10 handy." You are going to specify with particularity
11 the standard or material that you require and so forth.

12 WITNESS WILLIAMS: Well, I
13 don't think we'd leave it to the contractor to go and
14 find it either, Mr. Scott. He would be told where to
15 find it, and as Miss Minning said yesterday, that
16 there will have to be a development plan submitted to
17 the regulatory agencies to outline our requirement,
18 and maybe discuss it with the people at that time.
19 I think you're aiming at a tremendous amount of work
20 right now to define site by site what type of material
21 may be required, but we can sure discuss it in
22 generalities. Select material is certainly not
23 required for the full depth of the pads, the airstrips
24 and the roads. Poor material can be used within
25 limitations.

26 Q Well in general terms
27 I take it what you're saying is that you will obviously
28 adjust the specifications to the resource that exists
29 in the area.

30 A Yes, and as directed by

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 the people that have control.

2 Q Well, let's take it
3 step by step. First of all, leaving aside the govern-
4 ment, you will have to be economic and adjust your
5 requirements to what's there.

6 A Yes sir.

7 Q If there isn't Grade 1,
8 you obviously can't opt for Grade 1.

9 A If we still have a
10 requirement for Grade 1, we will have to bring it
11 in from some other location.

12 Q Right, and the second
13 thing you will have to do is you will have to submit
14 to whatever governmental requirements there may be,
15 as to what you can use and what you must leave for
16 others.

17 A We would submit that?

18 Q You would submit to
19 that.

20 A Yes.

21 Q They make the decision.

22 A Right.

23 Q And if they say, "You
24 can't have Grade 2," you may have to either put up with
25 Grade 3 or bring in your Grade 2 from somewhere else.

26 A I can see that, yes.

27 Q Now what I'm suggesting
28 to you is that it is impossible to make any determina-
29 tion as to priorities whatever until your minimum
30 specifications are established.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 A Yes.

2 Q And the same goes, I
3 take it, for the air field, the wharf, the pad, the
4 road, all the other facilities.

5 A Right.

6 Q And the same goes in the
7 same way for every other location of an industrial
8 complex like this as it's found in every compressor
9 station down the route.

10 MR. MARSHALL: Well, Mr.
11 Scott, you're talking about an area where there is
12 a shortage.

13 MR. SCOTT: No, but --

14 MR. MARSHALL: There's no
15 indication ^{that} there's a shortage at any other location

16 MR. SCOTT: No, but in every
17 other location there is a limited supply of various
18 qualities; isn't that correct, Miss Minning?

19 WITNESS MINNING: Everything
20 has a limit.

21 Q Right.

22 A So --

23 Q Even my friend's
24 interruptions, I presume.

25 MR. MARSHALL: No.

26 A I would say that in some
27 places the supply is unlimited, if you're talking about
28 it in that respect. But I think that it has to be
29 planned everywhere.

30 MR. SCOTT: But I take it it's

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 the posture of Arctic Gas, and it seems to me for
2 what it's worth it's perfectly sound, that they shouldn't
3 have primacy of place just because they're first, that
4 there has to be some reasonable allocation of the
5 resources between the needs of Arctic Gas and between
6 the needs of all the other people who will be building
7 things in the next 10 or 20 years in those locations.

8 A That's correct.

9 MR. MARSHALL: Mr. Scott,
10 surely you're talking about something that's government's
11 function.

12 MR. SCOTT: Well, I'm not --

13 MR. MARSHALL: If we say,
14 "Yes, government should do that," or "No, they shouldn't"
15 they're going to do what the legislation and regulations
16 say they are empowered and required to do.

17 MR. SCOTT: Well, first of
18 all I take it that the proposition I put to you, Miss
19 Minning, is undoubted as the position of Arctic Gas.

20 MR. MARSHALL: What's the
21 position?

22 MR. SCOTT: Well, the
23 proposition before it was interrupted was that Arctic
24 Gas does not propose to take the prime quality if it
25 can do without it.

26 A Sure, that's correct.

27 Q Yes, and they recognize
28 that that process of selecting lesser grades where
29 they will do, is important to assure that future
30

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 users have an opportunity or have an equal opportunity
2 to use what resources there are in any given location.

3 A That's correct.

4 Q Yes, and I take it --
5 maybe you've said this -- that no approach to allo-
6 cation can be made by this Inquiry, by the government,
7 or by anybody else until you know the specifications
8 of Arctic Gas, that is the minimum requirements that
9 they need of each grade.

10 Mr. Commissioner, can we
11 have our break now? I think I can, in view of those
12 answers, shorten a good deal of this.

13 THE COMMISSIONER: Just before
14 we break, Mr. Marshall announced this morning that
15 Arctic Gas had officially chosen the cross-delta
16 route as its prime route. The Inquiry will be
17 sitting in Inuvik in January and February to consider
18 the cross-delta route, and I thought I should tell
19 you that we will begin our sittings there on Tuesday,
20 January 13th at 10 in the morning instead of Monday,
21 January 12th. That's to suit the convenience of
22 counsel and others attending; and we will carry on
23 the week of Monday, January 19th. We won't sit the
24 week of January 26th. Then we'll sit again the week
25 of February 2nd and the week of February 9th in
26 Inuvik, and those dates, I think, should be regarded
27 as definite; and I think, Mr. Bayly, we intended the
28 week of February 16th to sit in -- to hold community
29 hearings in delta communities yet to be chosen or at
30 least the communities are chosen but the particular

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 order is something we'll leave to you. Is that --

3 MR. BAYLY: That's what
4 I understand, Mr. Commissioner.

5 THE COMMISSIONER: And then
6 the following week, the week of February 23rd we will
7 not be sitting. March 1st we will have further
8 community hearings in the delta communities, and then
9 on the week of March 8th, March 15th, and March 22nd
10 we will be holding formal hearings here in Yellowknife.

11 We have community hearings
12 for the people of Inuvik themselves will be held in
13 the evenings during the four weeks we will be sitting
14 there on days to be arranged later on.

15 MR. BAYLY: Mr. Commissioner,
16 I understand that we will be finishing Phases 2 and
17 3 prior to Christmas?

18 THE COMMISSIONER: Which we
19 shall do.

20 MR. SCOTT: Mr. Commissioner,
21 three observations, if I may. First of all I take it
22 that the announcement of the new prime route really
23 means that at that end of the pipeline there are
24 two alternatives.

25

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McCart, Minning, Williams
Dabbs, Harlan, Hemstock
Cross-Exam by Scott

1 Q The announcement of
2 prime route doesn't involve the abandonment of the
3 others as alternatives?

4 THE COMMISSIONER:
5 That is a very good
6 question.

7 MR.SCOTT: Are those true alternatives?

8 MR. MARSHALL: The interior
9 alternative would remain, Sir, and the--

10 MR.SCOTT: What about the west of the
11 Delta?

12 MR. MARSHALL: I believe that
13 would remain as an alternative. I will get instructions
14 on that one. I have no more information than what I
15 conveyed to the Inquiry this morning.

16 WITNESS HEMSTOCK: I think
17 I can confirm that the present prime route would remain
18 as the second alternative or as an alternative and
19 that the Cross-Delta would now take the position of
20 a prime route.

21 Q The second matter, Mr.
22 Commissioner, is that it was intended at Inuvik to
23 deal with the producer's evidence first and then deal
24 with the Cross-Delta. I emphasized to Mr. Marshall as
25 I have before, that our ability to do that depends entirely
26 on the proposition that the material in support of that
27 route is forthcoming. If it's not, it obviously won't
28 be possible to deal with it.

29 The other thing--the
30 third thing--that concerns me has to do with gravel
and the points I raised and maybe particularly appropriate

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 in the delta area where there are some potential short-
3 ages as I understand it. It, in terms of explaining the
4 matters to the community, it is interesting to know
5 the volumes that are required, but in terms of measuring
6 the implication of those volumes for a given area or
7 a given community, it is essential to have the minimum
8 requirements in terms of quality of the applicant. Now,
9 obviously this is a final design question to a certain
10 extent and as Mr. Williams has pointed out would involve
11 the most elaborate work if it were done for every
12 compressor station.

13 I wonder if Arctic Gas
14 might be prepared to select one compressor station and
15 analyze it in terms of the minimum qualities that they
16 can utilize so that then we would be able to in, at
17 least, in a sample area, say, well they are going to
18 need two million but it is going to be half a million
19 of this, half a million of that, half a million of the
20 other as a minimum standard. It does no good, it seems
21 to me, to a community to tell them that we are going
22 to take two million unless they know what they are going
23 to take, or what is the minimum they can put up with in
24 terms of quality.

25 I simply leave that for
26 Mr. Marshall.

27 MR. MARSHALL: Mr. Scott, I
28 appreciate your concern, but it would seem to me knowing
29 next to nothing about this subject that in each case
30 it would be a site specific consideration that would

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 be required. That is, near a particular community,
3 this situation might vary quite a bit from what it would
4 be near another community. So that we can zero in on
5 something and I can discuss this with the client, could
6 you tell me if you have got an interest in a specific
7 community?

8 MR. SCOTT: Well, as I
9 understand that the reserves at Thunder River are not--
10 I understand that the reserves at Thunder River are
11 primarily class three. That is, they are not top
12 quality, because it isn't there. Now, if specifications,
13 even in rough, were done for Thunder River we would
14 perhaps get a good idea of the minimum requirements that
15 are necessary for an airstrip, a pad and so.

16 WITNESS WILLIAMS: I don't
17 think we have any problem supplying you, Mr. Scott, with
18 the minimum requirements for one site but to outline
19 with any definite assurance where that material--exactly
20 where that material--is going to come from, I think is
21 a fair bit more difficult.

22 MR. SCOTT: I agree and that
23 is why I suggest one site should be taken and perhaps
24 Thunder River, as we have now looked at it, is the best
25 site for two reasons: First of all, because we've looked
26 at it and secondly because it is a site where you
27 don't have class one or two. And in the nature of the
28 thing we will have to put up with lesser classes.

29 A But your request was for
30 minimum requirements. Are you expanding it now to

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 also where the material is going to come from, where
3 those minimum requirements are going to be taken from?

4 Q If you were taking
5 Thunder River as an example, I would like to know which
6 of the sites you are generally understanding that further
7 inspection may lead you to conclude that the site is
8 unsuitable.

9 MR. MARSHALL: Could we
10 consider that, Mr. Scott, and let you know, perhaps after
11 the break?

12 WITNESS HEMSTOCK: I would like
13 to make just a couple of comments about this if I could
14 before we take a break. First of all, I think Arctic
15 Gas has not delved certainly not delved deeply into
16 this but there are other methods of reducing the use of
17 requirements for gravel and a typical one, of course,
18 where gravel or fill is required to prevent the degradation
19 of permafrost you can substitute an insulation layer.
20 That is another method that has to be really put in
21 this equation.

22 Another minor point is,
23 of course that there are some of these installations
24 where the gravel can be recovered after the use and
25 certainly in the abandonment of the pipeline this gravel
26 becomes available. Not all of it because obviously you
27 can't clean it all up.

28 I'm a little concerned
29 though about Arctic Gas going along with the minimum
30 standard of material in all cases. I'm particularly

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

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2 concerned that that should be imposed where there
3 would appear to be lots of better grade material because
4 the minimum standard normally would require some kind
5 of an economic penalty. Minimum standards can be very,
6 very low if you are prepared to spend a good deal of
7 money on upgrading it with say, as a very far out example,
8 with use of soil cement. And so it becomes a very
9 complex problem and / ^{while} we could take one example,
10 as you have suggested. I don't think we should try and
11 extrapolate from that to all other situations because there
12 / ^{are} certainly economic considerations would come in.

13 MR.SCOTT: Mr. Commissioner, I wouldn't
14 suggest for a moment dealing with Mr. Hemstock's third
15 point, that in an area where grade one gravel is in
16 great supply that Arctic Gas would want to do anything,
17 or that the public would them to do anything but utilize
18 what is available in good quantity and they will do
19 that and avoid any economic penalties. The problem
20 is though, that until we get some grasp of what they
21 can put up with in a given location. I agree it is
22 difficult to extrapolate, maybe impossible to extrapolate.
23 We lose the ability to assess to what extent there
24 can be rationing of resources in even one given area.
25 And I think one example, at least, would be helpful.

26 THE COMMISSIONER: All right,
27 we will adjourn for coffee.

28 (PROCEEDINGS ADJOURNED FOR MORNING RECESS)
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Dabbs, Harlan, Hemstock.
McCart, Minning, Williams.
Cross-Exam by Scott

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT:

Q I asked you at the break
if you would get out your data on the three potential
locations that are shown at Thunder River. Have you
done so?

WITNESS MINNING:

I did.

Q Can you tell what is there
in terms of the general supply problem that may be
anticipated in this area?

A Do you want to know what
these materials are at these sites in other words?

Q Yes, basically what do you
expect to find?

A I would say, will be out-
wash plain deposits, mostly sand, traces of gravel.

Q Is that in all three?

A Only, the only two that
I can tell are on the air photos, are the ones that
appear here. The third one --

Q The third one is the one
near the highway, is it?

A Yes. That is number 300,
it is supposed to be a Kame terrace.

Q That is gravel and sand?

A Sand and gravel.

Q Sand and gravel. I take
it then that we--- So we'll just let that be a
warning to you. I take it then ^{that} what we can say is that
at this location, the material at the three sites you

Dabbs, Harlan, Hemstock,
McCart Minning, Williams.
Cross-Exam by Scott

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2 have picked is pretty low quality?

3

A That's correct.

4

Q Yes. How does that fit

5

in with the requirements of two million cubic yards?

6

What are you going to be able to do? Or is that for

7

Mr. Williams?

8

A That's for Mr. Williams.

9

He is the engineer.

10

Q You have told him what's

11

there and that he has to tell you how he can live with

12

it.

13

WITNESS WILLIAMS: Well I

14

would say it as we discussed earlier Mr. Scott, that

15

we would use this poorer material for the core of pads,

16

airstrips and roads and so forth and if we are unable to

17

screen out sufficient gravel from these deposits, say

18

for the capping process, then we are going to have to

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bring it in from some other location, that we did

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discuss that briefly at the coffee break. Miss Minning

21

and myself and she advises that there is a bedrock

22

outcrop about twenty miles away on the Mackenzie. This

23

is one possibility where it might have to be used for

24

the top dressing, be brought in I would say either by

25

truck over the frozen ice surface of the Mackenzie in

26

the wintertime, or barged in, barged in in the summer-

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time.

28

Q So, what we can say now. in

29

a very preliminary way, is that at Thunder River it's

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likely, it's likely that you may have to go outside the

Dabbs, Harlan, Hemstock.
McCart, Minning, Williams,
Cross-Exam by Scott

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community to bring in bedrock to get good quality stuff
from some twenty miles away?

3

4

A Your speaking of the
Canadian Arctic Gas community, are you?

5

6

Q Right.

7

A That is a possibility, yes
sir.

8

9

Q What about alternate
sources for till, Miss Minning? Do you know of any in
this area? Of till?

10

11

12

A Pardon me? I can't---

13

14

Q Are there alternate
sources of till?

15

MR. MARSHALL. I was going to
say, could Dr. Fyles repeat that last question?

16

17

Q He has. We dealt with
one alternate source which is bedrock---

18

19

A That's right.

20

Q ---about twenty miles
away. What about other alternate sources such as till?

21

22

A Well that material is
around.

23

24

Q Do we know where it may
come from?

25

26

A That is not suitable for
the top if that is what you---

27

28

Q Well I understand that, but
do you know anything about alternate sources which might
include till in the neighbourhood?

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Dabbs Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

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A Yes there are alternate sources of low grade material in the neighbourhood.

Q Yes. Well now, I take it then that what we can say, Mr. Williams, is that this compressor station and construction pad site is, in the nature of the circumstances, if you include the whole complex of activities, including importing some bedrock, is going to be a pretty far ranging enterprise during the construction seasons.

WITNESS WILLIAMS: Yes, like the whole project. It ranges---

Q But my illusion of a compressor station and a construction pad in the midst of a forest is simply that, in illusion and this is going to be a substantial quasi industrial enterprise at Thunder River during the years when it is in operation. That is argumentative. I won't pursue the question. Well now, let me just ask one or two other matters about this location. What about the requirement for rip-rap such as at the wharf? That is going to be needed isn't it?

WITNESS WILLIAMS: Some course material will be needed. I think in the diagrams that we have shown in response to one the the PAAG questions or generally talking about sheet piling cribs with---

Q And you will need it also along the right-of-way adjacent to this location, for erosion control devices, perhaps? And perhaps in building your road way, your seven miles of road way?

Dabbs, Harlan, Hemstock.
McCart, Minning, Williams.
Cross-Exam by Scott

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A Yes.

Q And that I take it, in all probability will have to be imported as well?

A That is a possibility.

Q Yes. Well if Miss Minning is right, there is not doubt about it is there?

A Yes, but I think she would also agree that when those pits are open they may be slightly different than what the limited test drilling has shown.

Q And your view is that this imported material will be transported in by truck, in all probability?

A That was one possibility that I gave---

Q And transported in the winter?

A That was one of the alternatives Mr. Scott.

Q Does any other alternative occur to you?

A Yes I think I mentioned by barge in the summertime.

Q Yes, I see. Well now, what about processing at a location like this? To what extent at a site like this are you likely to engage in processing of materials to obtain the desired qualities?

A If there is some gravel in there I would see an attempt at least made at screening

Dabbs Harlan, Hemstock,
McCart Minning, Williams.
Cross-Exam by Scott

1
2 out the gravel for the surface dressing. This of
3 course, if going to require that the material be thawed
4 before that can proceed. This would be stock piling so
5 that thawing could take place.

6 Q And I take it in that
7 process, it will have to be washed?

8 A Not necessarily no.

9 Q No. Are the pits at
10 /or are
Thunder River, the potential pits going to be used as
11 sources of select backfill or is that likely, for the
12 construction of the pipe along the route?

13 A Yes, the, yes, if it is
14 sand it is certainly good bedding and padding material
15 Mr. Scott. As far as the cap for erosion control
16 measures it would be, it doesn't sound like it would
17 be ideal.

18 Q Well, I have noted on the
19 map, for example, that the nearest pit to the North is
20 about thirty-five miles away and the nearest pit to the
21 South is twenty miles away and I take it that it follows
22 therefore for a substantial length of pipe laying, you
23 are going to have to try to make due with the facilities
24 at this location where you can.

25 A Certainly that would be the
26 first attempt.

27 Q Will you be able to give us,
28 if you deal with this, any estimates of the volumes that
29 because
will be required for that/ as I understand they would
30 be volumes in addition to the volumes that we have dis-

Falls, Harlan, Hemstock,
McCart, Mirning, Williams.
Cross-Exam by Scott

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cussed and that are shown on the route map.

A We can make an estimate
Mr. Scott but, you know, I wouldn't guarantee the
reliability of it.

Q No. Now, one other thing.
At Thunder River, in addition to the processing to get
higher quality, will you be, you will obviously be
constructing some permanent buildings at the compressor
station and some semi-permanent buildings elsewhere?

A Yes.

Q Will you be able to
estimate generally how much concrete is going to
be required for that?

A I would think so. I think
we are
it would be fairly limited, generally/speaking of steel
buildings.

Q And where will the concrete
be produced?

A I have no idea.

Q Well, is it possible that
there will be a---

A I am sorry. The concrete
will be produced on the site, but where the material
will come from, at this time I have no idea.

Q Will there will any weight
casting done at this location?

A Not if there's not suitable
material.

Q But is it likely, for

Dabbs, Harlan, Hemstock,
McCart. Minning, Williams.
Cross-Exam by Scott

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example, just as you may have to bring in materials to

3

make concrete that you may bring in materials in order

4

to make weights?

5

A That is correct.

6

Q Because after all they

7

are made of concrete aren't they?

8

A Yes, that could be done or

9

the weights could be cast elsewhere and brought in.

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Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q I take it that it
2
3 has not been possible yet to give any detailed
4 analysis to, for example, how many weights will be
5 produced at Thunder River, or where the materials will
6 come from or anything of that nature.

7 A We have not got into that
8 degree of detail, no.

9 Q Is it likely that the
10 weights will be in the summer?

11 A That would be the economical
12 time to do it, yes. Then again, it depends on the
13 circumstances.

14 Q And therefore, I take it
15 if you make concrete and you make weights there is
16 going to be a substantial demand for water at this
17 location.

18 A Not for the weights,
19 themselves. I wouldn't say that, if there is washing
20 required, that takes a little more water.

21 Q Well, if you are going to
22 make weights and you are going to make concrete, do
23 I have it correctly that you are going to have to
24 have a weight testing site? Probably of some acres in
25 dimension? You are going to have to pour and cure
26 and form strip and store and all the rest of it?

27 A Some acres. It is less
28 than five, I would think, Mr. Scott, if you want numbers.
29 I don't think there is probably a great demand for--a
30 great need for weights in this particular area compared

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 to others. Three or four acres is big enough to cast
3 a fair few weights.

4 Q Well, is that going to
5 be done? Is all that work and storage going to be done
6 on the compressor pad, or is it going to be done in
7 elsewhere, adjacent to the compressor pad?

8 A We haven't decided that
9 yet. It could be down near the wharf site. It could
10 be at the station pad, or it could be some other location
11 not close to Thunder River and the weights hauled in.

12 Q No, but the point I am
13 trying to get at is assuming weights are going to be
14 made there and you told us that you may not make as
15 many there as you may make somewhere else but assuming
16 weights are going to be made there, fundamentally it will
17 be impractical to use ^{the} construction pad for that purpose.
18 The pad is getting pretty crowded right now and that
19 you will need an acreage either down near the dock or
20 elsewhere to carry on that operation.

21 A I don't think I would
22 agree with your statement that the construction pad is
23 getting pretty crowded. I'm not sure when MO4
24 is constructed, Mr. Scott, but this other work precedes
25 the station construction work. There ^{is} certainly plan to
26 be a camp there but that doesn't take the full area of
27 the pad.

28 Q Well, if you don't use
29 the construction pad, you are going have to develop
30 a good solid base somewhere to have your weight casting

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 yard.

2
3 A Yes, sir.

4 Q And, if you don't use
5 the pad, it is going to obviously have to be somewhere
6 else in the locality.

7 A You certainly need some
8 space. Yes, sir.

9 Q Now, let's deal with
10 stockpiling for a moment. What site preparations
11 will be made prior to constructing the gravel stockpiles?

12 A We are still discussing
13 the Thunder River area in particular?

14 Q As an example, yes.

15 A Yes, now what was the
16 question?

17 Q What site preparations
18 will be made prior to stockpiling gravel or other
19 materials?

20 A Well, first of all, the
21 wharf would have to be constructed at the, on the bank
22 of the Mackenzie. The gravel pit would have to be
23 developed, the materials--

24 Q Well, that is bringing in
25 gravel. Let's deal with stockpiling gravel that comes
26 from pits that you open at this location, stockpiling
27 for future use. You are going to take it out and you
28 are going to have to put it somewhere until you transport
29 it.

30 A This would be part of the

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 development of the gravel or granular borrow source
3 pit. Is this what we're discussing?

4 Q That's right. Yes,
5 presumably it is not in the pit. It's outside the pit
6 somewhere. It is taken out and stockpiled.

7 A Yes, sir.

8 Q All right now, what site
9 preparations do you make in the area before you stock-
10 pile it?

11 A Well, certainly clearing
12 if there are any trees on the site, they would have to
13 be cleared off. Probably the surface vegetation stripped
14 off and piled to one side. Then the pit is developed and
15 the material is stockpiled on the cleared area. Is
16 that what you had in mind?

17 Q And they're going to be
18 accessible to the right-of-way, are they?

19 A The strip map does not
20 show what--does not show an all-weather road between the
21 gravel pit and the right-of-way, or the station so the--
22 and during coffee break I looked at this and maybe the
23 trouble is the bar chart that you pointed out to us this
24 morning showed work going on in the summer months, I
25 think. Wasn't ^{it} generally June, July, August that or
26 September--something like that? And that's the--that
27 is intended to mean the development of the borrow pit
28 and the stockpiling of materials. If you go to Volume--
29 Application Volume 13A in the construction schedule in
30 that portion, you'll see that the, a lot of the work

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 following the stockpiling of granular material goes on
2 in the winter months and that would be the case here,
3 probably because we haven't shown an all-weather road
4 that the material would be hauled from the stockpile to
5 its end use location in the winter time.
6

7 Q Well, let's just move
8 along then and talk about another kind of stockpiling.
9 What about maintenance stockpiling? You are going to
10 have to stockpile gravel and other granular material
11 for maintenance purposes. Isn't that so?

12 A Yes, limited quantities.

13 Q Yes, and that's going to
14 have to be adjacent to the right-of-way in some, in most
15 cases?

16 A It could be, for instance,
17 stockpiled right on top of the runway--an additional
18 thickness on the runway that you could scavenge off at
19 a later date.

20 Q Well, is that what you
21 intend to do? What I am concerned about is that, is to
22 get the whole picture of the dimension of this project
23 we have to put into it something to which only
24 limited attention has been given. That is, the presence
25 of fairly substantial stockpiles. Now, if you are going
26 to--if your stockpile is going to be the top foot of
27 your airfield, we won't have to worry about it because
28 we know the dimension of your airfield. But if your
29 maintenance stockpiles are going to be something else,
30 I'd like to know if they are going to be near the right-

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 of-way and how they are going to be prepared because
3 they have, obviously the existence of that takes up
4 land and has environmental impacts.

5 A Well, they are going
6 where they to have to be stockpiled accessible to the place
7 that they are going to be used. This would probably
8 be on or adjacent to the station pad or on the runway
9 as I have suggested or on the road, the permanent road
10 in the location. I don't really see this being a large
11 land requirement, Mr. Scott. There may be a few addi-
12 tional acres required for this but this is detail that
13 we really haven't gotten into yet.

14 Q Yes. All right. Are you
15 going to cover the materials that is stockpiled or do
16 you know?

17 A So that it can be used
18 in the winter. I would think not.

19 Q Are you going to use
20 any chemicals to inhibit freezing in the maintenance
21 stockpiles?

22 A No, sir. It would be
23 rather unlikely that it would be required in the winter
24 time. I think the requirement would generally be in
25 the thawing periods.

26 Q If you are not going to
27 cover it and you are not going to use chemicals, I'm
28 not concerned.

29 I should ask you though,
30 I take it from what you've said earlier that your

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 maintenance will be done in the winter. I thought that
3 was one of the features of this plan.

4 A Right and when I was
5 talking about maintenance, I was thinking more about the
6 maintenance of the airstrip and the roads. For mainten-
7 ance of the right-of-way, that is a little further down
8 the line. There won't be a large construction camp
9 on the pad. There should be then a substantial amount
10 of area on the pad available for stockpiling material.
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Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 Q Well, are we going in
3 circles, because I understood it to be the position
4 that you would make the stockpiles when they had
5 the borrow pits open, and that seems to suggest that
6 you will be stockpiling at some place other than the
7 construction pad which you will then be using.

8 WITNESS WILLIAMS: I think
9 we're talking about two different things, Mr. Scott.
10 The discussion of stockpiles earlier in the week, I
11 think -- and I may be wrong, other people spoke of
12 them but I thought we were talking about small
13 quantities required around the community as you describe
14 it. I wouldn't see going out and doing a lot of
15 stockpiling for right-of-way maintenance very much
16 ahead of the time that you knew what was required.
17 We're not sure what kind of subsidence is going to take
18 place along the right-of-way. I really wouldn't see
19 that being done until the requirement is better known.

20 Q Well, that's fine, then
21 that's the position as I understand it, that you won't
22 be stockpiling for maintenance purposes in any large
23 quantities, but will wait until it is required to be
24 used.

25 A That seems to make sense
26 to me. Now other people may have different ideas.

27 Q Well, all right, on that
28 proposition I take it that that contemplates reopening
29 the gravel pits from time to time in the future, as
30 they may be required.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 A This is a distinct
2 possibility, yes.

3 Q Well, don't let Miss
4 Minning get too many trees in there.

5 A It's that Dabbs fellow
6 we have to watch out for.

7 Q Well now, the Fort
8 Simpson route change involves 17 borrow sites for
9 which no specific site or environmental information
10 has been supplied, like that that appears in the
11 responses volume for the other borrow sites. Is that
12 going to be provided?

13 WITNESS MINNING: That's part
14 of the cross-delta borrow there together in one
15 volume.

16 Q Oh, the Fort Simpson
17 environmental information that relates to borrow
18 locations will also be in the same volume as the
19 cross-delta.

20 A Yes.

21 Q And that will contain
22 environmental information about the pits.

23 A The report is the same
24 format as the report that you see here, in the respon-
25 ses.

26 Q All right, thank you.
27 Well now, just to clear up one or two matters, in
28 Appendix "A" to the responses volume, there was set
29 out what was called a list of criteria for selection,
30 location, development, and restoration of borrow sites.

Dabbs, Harlan, Homstock
McCart, Minning, Williams
CrossExam by Scott

1 At pages 45 to 49, and pages 52 to 55, and 59 to 62,
2 you deal with criteria for upland borrow pits, and
3 similar criteria for borrow pits in flood plains, and
4 for quarries. Now, I got the impression from some-
5 thing you said on Tuesday that part of your current
6 work, Miss Minning, is a revision of these criteria.
7 I think you used the expression "guidelines" for
8 borrow operations. I don't have the transcript in
9 front of me but I understood you to say that you were
10 revising the guidelines for borrow location and
11 operations. Is that correct or is it not?

12 A . I don't remember saying
13 that.

14 Q Well, whether you said
15 it or not, is it correct? Are you engaged in the
16 process of revising these guidelines or criteria?

17 A I think this is inherent
18 in the idea of submitting a development plan for each
19 site. Obviously those rules will not apply to every
20 site, each rule to every site, because the things that
21 are present at each site may vary. We may not need
22 to do No. 1 or No. 3, maybe we'll need to do something
23 else.

24 Q Well, I understood you
25 to say that in every plan, every plan has to be site
26 specific, and I understand that. I also understood you
27 to say that there are criteria that are contained in
28 the responses volume. What I'm asking is was I wrong
29 in concluding that you were engaged in some revision
30 of the criteria or are those criteria going to be the

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 criteria that stand?

2 A We would like to have
3 some feed-back from the Government of Canada as to
4 whether our criteria are acceptable.

5 Q Well, you better ask the
6 Government of Canada, not me. I don't represent them;
7 but at the moment are you engaged in a revision of
8 those criteria?

9 A I guess you would say
10 that, yes.

11 Q When may we expect the
12 revised criteria to be available?

13 A I would say at the time
14 of the development plan.

15 Q No, but presumably --
16 I recognize that the plan has to be specific and relate
17 to the location; but presumably as you've indicated in
18 the responses, the plan is going to be based on certain
19 principles. The principles are the criteria. Are we
20 together so far?

21 A Yes.

22 Q All right, you've told
23 us that you're engaged in revising those criteria.

24 A That's right.

25 Q All right. Now when is
26 that revision work likely to be completed so that
27 we can see the revised criteria?

28 A I can't speak for the
29 people who will be criticizing these criteria that
30 we have. I can't say when it will be done because I

1 don't think there is a guideline for borrow pit develop-
2 ment like there is a pipeline guideline.

3 Q All right. Well can we
4 put it this way, if there is no criticism forthcoming
5 you plan no revision of the criteria?

6 THE COMMISSIONER: I think
7 there was an objection to that question.

8 A If further studies
9 show that revisions are necessary, we will make
10 revisions.

11 MR. SCOTT: Q Well, you see
12 the difficulty that we're confronted with, and I want
13 to be perfectly plain, is you've set out in the
14 responses the criteria which are only principles, I
15 agree, by which certain things will be done. We
16 accept those as your criteria and then all the parti-
17 cipants will make the evaluation of whether those
18 criteria are satisfactory or whether they can be
19 applied. Now I understand you to say that those
20 criteria are being revised, that is that at some
21 stage they may be altered.

22 A That's correct.

23 Q All right. Now is that
24 process, the process of alteration of those criteria
25 one that you're participating in now? Is it one that's
26 ongoing now?

27 A Yes.

28 Q All right, when may we
29 expect to have Arctic Gas' best guess as to its borrow
30 pit criteria?

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 A I was told to say 1977
2 with the development plan.

3 Q Well, I take it then that
4 we may assume that there will be no revision of criteria
5 forthcoming from Arctic Gas except in site specific
6 development plans that are produced for each pit.

7 MR. MARSHALL: Well, Mr. Scott,
8 the witness indicated they're waiting for some
9 reaction from government, and they haven't got it yet.

10 MR. SCOTT: But I haven't asked
11 yet.
12 that question. If there is no reaction from the govern-
13 ment, as may be, are you going to still revise your
14 criteria, or are you going to stand by the ones you
15 have?

16 A We'll revise them if
17 we ourselves find that the further studies that we've
18 been doing show these are unacceptable to us.

19 Q Unacceptable to who?

20 MR. MARSHALL: She said, "to us".

21 A To us.

22 MR. SCOTT: Q To us, and that
23 process is under way, that process of study.

24 A Yes, it's a never-ending
25 process.

26 Q Have you any revisions
27 in the works?

28 A You mean do we have a
29 report coming out?

30 Q Do you plan at the
moment, are you discussing the alteration of any of

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 these criteria that you can tell us about?

2 A No.

3 Q All right. Well now,
4 let's come to site plans, because you've placed some
5 emphasis on them, and these site plans -- and you've
6 given the Commissioner, I think, four examples or
7 two examples -- are intended to be used

8 (1) for quarry permit applications;

9 (2) for reviewing your proposals with local people or
10 other groups concerned about such things; and

11 (3) in your own planning design^{and} contracting procedures.

12 A Where did you get all
13 that from?

14 Q I was summarizing what
15 you told us the other day. You produced a site plan
16 and you said, "These quarries have to be analyzed
17 on a site specific basis, and when we apply for a
18 permit, here is the kind of thing that we're going to
19 produce when we apply for the permit."

20 A I said this is an example
21 of what might be --

22 Q All right.

23 A We do not know what is
24 required in the plan.

25 Q I understand that. But
26 at the moment that's the kind of thing you contemplate
27 producing, subject to what the government tells you
28 you have to.

29 A That's right, that's right.

30 Q All right, and it's also

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 the kind of thing that you intend to produce for the
2 purpose of the consultation program with the communities
3 that you outlined earlier in the week.

4 A That's right.

5 Q And it's also the kind
6 of thing that you will need for your own contracting
7 procedures.

8 A Yes.

9 Q Yes. Now the two that
10 you showed us the other day, I take it, are merely
11 diagrammatic illustrations.

12 A That's right.

13 Q And are not assumed to
14 contain anything like all the information that will be
15 on the ultimate site plan for any location.

16 A That's correct, and we
17 had some artist's conceptions put in there, too, to
18 give us an idea to the eye ^{because} the regular plans are
19 not as exciting.

20 Q I note for example on the
21 two plans that you put forward, one of the notes was:

22 "All necessary erosion and drainage control
23 measures will be employed to prevent the con-
24 tamination of adjacent water sheds by siltation."

25 That almost provoked a cheer from me, but I take it
26 that on the ultimate site plan you'll have to go and
27 you will want to go much further than that and show
28 precisely and in detail the erosion control measures,
29 their location, their design and so on.

30 A Yes.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q And that will be contained
2 on the site plan, so not only the government but the
3 communities will know precisely what you intend.
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Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 Q Yes. And let me just deal
3 with some other things to see if these will be on the
4 site plans that go to the communities and to the
5 government. Leave out of it what the government requires
6 you to do and just tell me if this is what Arctic Gas
7 is prepared to do. I take it, that you will show details
8 of the borrow source, area thickness, quantity grade
9 and the test bed and borehole detail if any?

10 A Yes.

11 Q Yes. You will show the
12 placement of the pit and its boundaries in the borrow
13 source and an estimate of the quantity of grade to be
14 used and remaining.

15 A Yes.

16 Q You will show the occur-
17 rence of perma frost, ice control and water tables.

18 A Yes.

19 Q I am sorry, ice content.
20 You will show on the site plan the machinery to be used
21 and the timing and whether a processing or washing plant
22 is to be utilized.

23 A Yes.

24 Q You will show the drain, I
25 am sorry--

26 WITNESS WILLIAMS: All this
27 equipment your talking about in general terms. not
28 specific I wouldn't say Mr. Scott in the development
29 plan. That is all subject to change. It will be
30 standard gravel handling equipment, but to itemize each

Dabbs Harlan, Hemstock.
McCart Minning, Williams.
Cross-Exam by Scott

1
2 piece of equipment that is going to be there, I would expect that.

3
4 Q Oh I meant really that you
5 will show on the plan the nature of the process as
6 exhibited by the equipment, whether it is a dragline
7 operation or what. I am not asking to list every--

8 A That is the way I heard it.

9 Q -- every forklift. I
10 think you're right, Mr. Williams. I take it that on the
11 site plans you will also show drainage diagrams,
12 stilling basins where you have them and all of the other
13 drainage apparatus that will be available during
14 operation?

15 A Yes.

16 Q I take it that you will
17 show the final form of the pit and the rehabilitation
18 techniques in specific terms including spoil disposal,
19 drainage and revegetation where it is to be done.

20 A Yes.

21 Q I take it your site plan
22 for opening a pit will also show whatever follow-up
23 monitoring plans you may have in detail.

24 A Could you explain that
25 one?

26 Q Well it occurs to me
27 particularly if drainage is affected by the operation of
28 the pit, that after the pit is closed, Arctic Gas will
29 want to monitor the state of the pit from time to time.
30 You agree with that, don't you?

Dabbs, Harlan, Hemstock.
McCart, Minning Williams.
Cross-Exam by Scott

1
2 WITNESS WILLIAMS. I was just
3 shaking my head at that. In detail Mr. Scott, that is
4 pretty hard to predict ahead of time with any great
5 detail. Certainly a monitoring plan will be --

6 Q Yes.

7 A -- shown in general terms.

8 Q My concern is, Mr Williams
9 as you will understand, is that if this is to be not
10 only the mode of getting the permit, as may be required
11 by the government, but also the mode of consultation
12 with the adjacent communities that will want to have
13 from Arctic Gas, as detailed an account of what is
14 proposed and contemplated as they can get and one of the
15 things they will want to know is to what extent Arctic
16 Gas will monitor the pit after closure or after its
17 major utilization and I take it that will be show in
18 some form, will it?

19 A Yes when your speaking of
20 communities, have you any idea of how far from
21 communities these pits are?

22 Q Well the one at Fort Good
23 Hope is within short walking distance--

24 A Fine.

25 Q -- and there are other--
26 The one at Inuvik is on the outskirts of the town with-
27 in the community lands and there are a number of other
28 locations where the pits are, as you know. adjacent to
29 the communities.

30 A We are talking about ones

Dabbs, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 then that are within three or four miles of a community?

3 Q Well no, I am talking
4 about all pits because communities may develop in other
5 locations in the next five or six years.

6 A And who would you take
7 them to then if the community is not developed yet?

8 Q Well you might ask
9 Professor Jackson who has developed a community hearing
10 apparatus, that at the conclusion of the hearings will
11 be available. But I take it as a matter of principle,
12 the site plans are going to show this kind of material.

13 WITNESS MINNING:

A Yes sir.

14 Q And, I take it that in
15 short form they will include a kind of environmental
16 impact statement.

17 A Yes.

18 Q And will specify whether
19 it is to be used for sanitary land fill or other
20 purposes after its major use is completed.

21 A Yes.

22 Q Anything else that should
23 be on the plans that I have omitted in your judgment?

24 WITNESS WILLIAMS:

A That sounds like a fairly
25 exhaustive list to me.

26 Q Miss Minning?

27 WITNESS MINNING:

A Yes I think that is a
28 pretty good list.

29 Q All right. Well now, Mr.
30 Hemstock, table two, appendix "A", of the Responses

Lallos, Parlan. Hemstock,
McCart, Minning. Williams.
Cross-Exam by Scott

1
2 Volume provides enviromental comments on each of the
3 sites under the heading Mammals, Birds, Vegetation,
4 Fish and so on. What I want to ask you is how you
5 propose to proceed from, do you want to get that out,
6 table two of appendix A?

7 WITNESS HEMSTOCK: Yes I
8 have it.

9 Q Now that information is
10 obviously very preliminary, isn't that true? And in
11 short form?

12 A Yes that's right.

13 Q Well what I want to know
14 is how you are going to proceed from that stage which
15 is represented by table two, to the kind of information
16 that will require, will be required to be at hand to do
17 a thorough enviromental assessment of the implications
18 of any given pit?

19 A We would anticipate having
20 enviromental people do site specific analysis, probably
21 at the same time that the more detailed engineering
22 materials were being gathered.

23 Q Well now, for example, on
24 table two you list pits, as - or you list five pits as
25 denning areas and thirty-eight pits as being potential
26 denning areas and I think Miss Minning said the other
27 day that the way to deal with that is to move the pit
28 altogether or to move the site within the pit to an
29 area where there was no denning. What I am concerned
30 about is how are the enviromental people on the one

Dalls, Harlan, Hemstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 hand and the people who are drawing the plan for
3 submission for the permit going to get together to see
4 that there is full input before the plan is drawn?

5 A Well they are normally
6 together all of the time and this is just a, would seem
7 to me a routine operation that the engineering plans
8 are being drawn up, the enviromental information is
9 available from enviromental people who have visited
10 the site.

11 C Well let me put this
12 proposition to you. One thing that has come out is
13 that, for example, in terms of route and I am generalizing
14 outrageously here, but in terms of route the engineers
15 drew the route and then it was submitted to the
16 enviromentalists to be assessed and they made their
17 comments and certain changes resulted. If I may say
18 so, I suppose the criticism that can be made of that
19 mode of procedure is/that the role of the enviromentalist
20 then becomes reactive and once the route, for example,
21 is selected, the room for movement is substantially
22 reduced and you understand, I take it, what I am talking
23 about there?

24 MR. MARSHALL: Well yes, it is surely
25 argementative Mr. Scott. That might be the way you
26 characterize it.

27 MR. SCOTT:
28 Q I think at this stage,
29 Mr. Marshall, there can be no doubt that that was the
30 way it was done. There is nothing wrong with that, per
se, but isn't it true Mr. Hemstock that once, in dealing

Dallin, Dorian, Penstock,
McCart, Minning, Williams.
Cross-Exam by Scott

1
2 with the route, for example, ^{that} the engineers have
3 selected a tentative route and submitted it to the
4 environmentalists for comment, the range of options is
5 reduced.

6 A I don't really see that
7 follows in this case. Certainly, the engineers have
8 indicated perhaps their preference but I don't think it
9 follows, no.

10 Q Well is that the process
11 that is going to be followed here? That the engineers
12 will draw up the site plan for the quarry and then
13 submit it to the environmentalists?

14 A No, I think that, in this
15 case, that the environmental information is gathered
16 probably at the same time as the engineering detail is
17 gathered and the input would be together from that
18 stage on. Certainly, information such as fox denning
19 is quite specific and that would be gathered and available
20 to the engineer right from the start.
21
22
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Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q Do I understand then
2 that the environmentalists will not be confronted with
3 a site plan for a location and simply be limited to
4 inducing the engineers to move the quarry operation
5 to another part of the same pit?

6 WITNESS HEMSTOCK: No, there
7 would be environmental input right from the start.

8 Q So that the environmen-
9 talists will be able to, if not veto, at least advance
10 stern criticisms of the very location itself.

11 A Yes.

12 Q What environmental
13 criteria, for example, in your judgment, might be
14 powerful enough to persuade Arctic Gas not to open a
15 pit that is on the preferred or alternative list?

16 A I would think as an
17 example which appears here in Table 2, in certain
18 areas, particularly along the slope, I'm informed that
19 fox denning areas are very scarce and that some of
20 these dens have been occupied for many decades. So
21 this would appear to me to be very important envir-
22 onmentally, one which might require a movement to
23 another area. Certainly a very careful assessment
24 of the kind of impact that there would be.

25 Another possibility would be
26 the location of a rare and endangered nest site
27 perhaps close to a quarry.

28 Q In the Assessment Group
29 Report, and I don't think you have to get it out,
30 the report attempts a provisional rating of the pits

Dabbs, Harlan, Hemstock,
McCart, Minning, Williams
Cross-Exam by Scott

1 and divides them into types 1, 2, and 3, and I think
2 in decreasing order of sensitivity. You're familiar
3 with what the Assessment Group has done in general
4 terms in that area?

5 A I'd like to look at it.

6 Q All right, it's at page
7 245 and following.

8 A Page 245?

9 Q Yes, to page 251, and
10 just so that the rest of us won't have to get it out,
11 I take it that you agree with me that that's an
12 attempt by the Assessment Group to divide the pits
13 into areas of high environmental concern, medium
14 environmental concern, and low environmental concern.

15 A Type 1 pits being the
16 ones with the greatest environmental concern, type 2
17 pits in a medium position, and type 3 with relatively
18 little concern.

19 Q Yes. What the Assessment
20 Group has tried to do is flag the pit locations that
21 it occurs to the Assessment Group may raise significant
22 environmental issues.

23 A Yes.

24 Q Well now, has Arctic
25 Gas reviewed that evaluation of the pits, or is that
26 work under way? In deference to Dr. Fyles, I won't
27 ask if you decided not to look at it.

28 WITNESS MINNING: Yes, I
29 think you could say we are reviewing this, certainly.

30 Q Well, may I ask if there is

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 at the moment any reservation about the classifications
2 that the Assessment Group has come to?

3 WITNESS HEMSTOCK: I don't see
4 any problem with the concerns which are expressed here
5 in the commentary. No.

6 Q Fine. Well, I take it
7 that as part of Miss Minning's review this work will
8 be reviewed to determine whether pit locations should
9 be altered.

10 A Yes, there will be an
11 environmental input to that, yes.

12 Q And will that form part
13 of the report that is ultimately going to come forward
14 as to what pits will be selected?

15 A Yes.

16 WITNESS MINNING: Yes.

17 Q Thank you. Well now,
18 let's take an example just so I can see how this
19 works. Most of the type 1 pits are active flood plain
20 pits and I have some other questions about them
21 later, but I'd just like to deal with Pit 147, which
22 is in the valley of the Rat River west of the delta,
23 and which is listed as a high concern pit. I'm at
24 sheet 1-C-0200-1017. Have you got it in front of you
25 there, sir?

26 WITNESS HEMSTOCK: Yes.

27 Q Now, it seems to me
28 that this is a pit that is just rife with difficulties,
29 and I wonder if any decision has come to -- has been
30 made in the course of reviewing it?

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 First of all I note that it's
2 on a low flood plain adjacent to the Rat River, and you
3 propose to take a lot of material from it, that the
4 Rat River is generally regarded as a sensitive river
5 with some char, that the native people utilize this
6 resource, that the native people use it for other
7 purposes as well as fishing, and that your own listing
8 refers to it as being both a mammal and raptor concern
9 area, and that the site is a proposed I.B.P. reserve.

10 Now --

11 MR. MARSHALL: Mr. Scott, I'm
12 trying to follow you. I see some of those things indi-
13 cated in the Assessment Group's Report, but I don't
14 see others of them. Are you making reference to other
15 materials? Other reports and so on, just so that we
16 can follow you?

17 MR. SCOTT: I think there are
18 other sections of the report that deal with this, but
19 I don't have it now, and the question I'm really asking
20 is I thought that if a review were under way, this might
21 be a pit that you'd throw out pretty quickly.

22 WITNESS MINNING: Mr. Scott,
23 this is on a fossil flood plain. Is that the one you
24 have?

25 Q Yes.

26 A It's up on the terrace.

27 Q It's right on the edge
28 of the fossil plain.

29 A Also it's not on the
30 cross-delta route.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 Q No, but Mr. Marshall
2 hasn't demanded that alternative and as he appears
3 to have reserved it, I'd like to know. The point
4 I'm getting at is it seems to me if a review process
5 were under way, this would be a pit that you would
6 come to a very early conclusion on, one way or the
7 other. It's rife with concerns, your own as well as
8 the Assessment Group's.

9 MR. MARSHALL: Mr. Scott,
10 the difficult is you've put forward about 15 different
11 factors without directing the witness to the source
12 of these statements, nor have you given her a chance
13 to say whether she agrees with them or disagrees with
14 them. Now you're asking her whether or not this
15 oughtn't to be a prime candidacy for being dropped.

16 MR. SCOTT: Well, all right.

17 Q It's a relatively
18 low flood plain, isn't it, Miss Minning?

19 A Yes.

20 Q Yes, and a great volume
21 of material appears to be -- going to be taken from
22 that location.

23 A Yes.

24 Q Yes, and I take it that
25 the Rat River is a reasonably sensitive river with
26 char. Is there any doubt about that?

27 A Yes, I mean no.

28 Q There is no doubt about
29 it?

30 A Peter, is there a doubt?

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 WITNESS McCART: Well, let
2 me point out that the spawning areas, the over-wintering
3 areas are considerably upstream of this particular
4 location. As far as I know, this area is used as
5 a migration route, obviously, because they have to
6 get downstream. But I would not consider this to be a
7 super sensitive area for most of the year, except
8 during the migration period.

9 Q Well, is it suitable,
10 in your judgment, for the operation of a gravel pit?

11 A I haven't examined it in
12 detail because we haven't got that far in the design
13 phase where I would be asked to go in and look at this
14 place specifically and in detail.

15 Q I see.

16 A If and when we do look
17 at it, we also know there's a fishing site in the
18 vicinity. If and when we do look at it --

19 Q Do you know there is a
20 fishing site in the vicinity?

21 A There is a fishing site
22 in the vicinity of the crossing there.

23 Q Yes. Are you aware that
24 it's on your own listing as both a mammal and raptor
25 area? That will be for Mr. Hemstock.

26 WITNESS HEMSTOCK: Yes.

27 Q Yes, and are you aware
28 that it's a proposed I.B.P. reserve?

29 A I was not aware of the
30 proposed I.B.P. site there.

Dabbs, Harlan, Hemstock
McCart, Minning, William
Cross-Exam by Scott

1 MR. MARSHALL: If you have
2 some information about the proposed I.B.P. site, as
3 the panel don't seem to be aware of it, perhaps you
4 could give them the information.

5 MR. SCOTT: Well, let's leave
6 out the I.B.P. site for the moment. If the panel
7 isn't aware of it, it's referred to in the Assessment
8 Group Report, but let's leave it out. What I am saying
9 is that surely in the process of review this is a
10 decision that you would be well on the way to making.

11 A Well, let me see if I
12 could go through the kind of decision-making that
13 would be involved in^{the} selection of a pit like this, and
14 we would supposing we accept those concerns which have
15 been outlined, what you would have to do is go in and
16 examine the site in detail to see exactly how the
17 operation, the opening and operation of that pit would
18 impinge on those concerns. As Dr. McCart mentioned,
19 it is not, at first glance apparently, a matter of
20 concern to the spawning areas; but it might be a con-
21 cern, depending on how far away from the bank of the
22 river it was and what kind of berms could be built
23 between the pit and the river, it might cause him some
24 concern from siltation.

25 There are other factors. How
26 important is that in terms of the whole area to mammal
27 populations? Where is the raptor site and how far
28 away is it? Is it in fact, it's simply not enough to
29 say it's generally an important raptor area, but
30 specifically how far away are the nest sites?

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 WITNESS HEMSTOCK: I note here that there
2 is some concern here from an archaeological standpoint
3 and that might very well be a pretty important location.
4 One of the other factors that is also important and the
5 government group has noted it and that is that there is
6 an alternative source apparently not so very far away.

7 I think you put all
8 of those things together. You decide how you can
9 mitigate the impact that are possible and then you have
10 to make a decision on whether you try and open this
11 pit or whether you would move to another location.

12 Q Mr. Bayly, and I don't
13 ask you to take this into consideration, but he has
14 told me that it--in a note--that it is a fantastic
15 incredibly difficult we
16 though/canoe trip, but I take it that what/may anticipate
17 then on the site plan that is forthcoming for each of
18 these locations is the kind of analysis that you have
19 now given us!

20 A That's right.

21 Q And that is necessary, not
22 only so that government can have your views, but so
23 that--where there are communities--so that the communities
24 can pass on them and hear what you have to say?

25 A That's right.

26 Q So that for each of these
27 quarries, there will be in effect an environmental impact
28 statement.

29 A Yes.

30 Q Analyzing all those issues

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 of the type that you've described?

2 O Well now, I would like
3 to turn to gravel mining on flood plains. To begin
4 with, I'd like to ask that Mr. Williams, particularly,
5 to get out Spread C in the pipeline construction
6 schedule which I think was referred to yesterday.

7 Mr. Commissioner, it is
8 on the Prudhoe Bay extension.

9 MR. MARSHALL: Mr. Scott, just
10 so I can get oriented, is that from the border east?

11 MR. SCOTT: Yes.

12 MR. MARSHALL: Third winter..

13 MR. SCOTT: Well now, Mr.
14 Williams, do you have that in front of you there?

15 WITNESS WILLIAMS: A It is the
16 strip map that you are going to be referring to, is it,
17 Mr. Scott?

18 Q Yes.

19 A Yes, I have it.

20 Q Is that a reasonably
21 typical schedule for a spread?

22 A Typical for this project,
23 for Arctic, do you mean Arctic Gas's plan, Mr. Scott, or
24 typical --?

25 Q Yes. Moving from the
26 delta to Alaska.

27 A Yes, I think it is.

28 Q Yes. And I take it that
29 this ^{is} planned for construction in the third winter?
30

124

Dabbs, Harlan, Pemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 A Yes, sir.

3 Q And that during the second
4 winter, you will build the snow roads on the Yukon
5 North Slope even though no pipeline construction is
6 actually planned?

7 A I wouldn't think I would
8 have to look at this for a while. I wouldn't think for
9 the full length, Mr. Scott. Somebody is going to
10 be required to get equipment in to do preliminary work.
11 Yes, but--

12 Q Well, even more than
13 that, in reply to Mr. Anthony the other day, you indi-
14 cated that when you are going to mine a flood plain
15 you are going to get the equipment in the previous
16 year because you are going to mine it in the autumn?

17 A Yes.

18 Q And therefore you can't
19 get it in the summer so you are going to have to get
20 it in the previous winter?

21 A Yes.

22 Q And therefore you will
23 need a snow road in the second winter in order to get
24 your mining equipment in to that the flood plain mines
25 that are shown on this map?

26 A Yes, I thought you were
27 intimating that it was the full length of the spread and
28 I don't think that is the case.

29 Q Well, whether it is the
30 full length or not, the snow road is going to have to

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

every location at which you want to place equipment.

A Yes, sir.

Q Will these roads in the second winter also be used to bring in water hauling equipment?

A Yes, I would think so.

Q Yes.

A I would like to point out though, that this, that winter movement doesn't have to take place in the early part of the winter like we're talking about during construction. It can be delayed --

Q Like Foothills. You can have a good winter vacation and don't have to worry about getting out too early, is that it?

A You don't have to build your road early in the season in order to get --

A You are right. Yes.

Q Well now, on the work schedule for the spread, there doesn't appear to be any activity whatever shown in relation to mining or quarry. Why is that?

A Which document are you referring to now?

Q The bar chart.

A The bar chart in the response to the PAAG question or the bar chart in 13A?

Q It is the bar chart in 13A in which you set out--

Dabbs, Harlan, Hemstock,
McCart, Minning, Williams
Cross-Exam by Scott

1

2

Q What I am frankly

3

Concerned about is that my sense that this may be sort

4

of a whole new thing that has come upon us, because in

5

the bar chart there is no suggestion of any of this

6

kind of activity in the autumn of the construction

7

winter. I wonder if it was accidentally left/^{out}of the

8

bar chart or if it was something that was developed in

9

response to the problem of getting equipment to the

10

flood plains.

11

A I don't think I agree with

12

your statement. I think it is shown, Mr. Scott. If

13

you look at the bar chart in the construction spread,

14

the construction schedule for Spread C on this one it

15

shows snow and ice roads in the winter of '77 and '78.

16

Q Yes and that's the

17

proceeding winter. Where does it show quarries?

18

Perhaps I've misunderstood

19

the bar charts. If the bar charts are simply charts

20

designed to show the construction per se, I have no

21

quarrel but I take it, from looking at this that they

22

don't show, for example, the periods when you will be

23

working to get the material out. Maybe that's not part

24

of construction in your--for these purposes?

25

A I think you are right. It

26

does show the --

27

Q The actual construction.

28

A The actual construction

29

and it doesn't show the work required to get the

30

equipment in there. That is correct.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

Q So then, we must look at these bar charts as revealing only the actual construction of the line and not any work that may be done on the spread for the purpose of getting materials like rock or gravel into place, out from the mine and into stockpiles.

A That would appear to be correct.

Q Yes. Now on spread C, I take it that there are four flood plain pits: 124, GM34, 125, and 127. And two other main pits and two alternates that aren't flood plains. Is my summary correct?

WITNESS MINNING: A Would you go through those numbers again please?

Q Well, there are--including alternates--there are eight pits that are shown on spread C. Four of them appear to be in the active flood plain.

WITNESS WILLIAMS: Yes.

Q And just to review them, the work in those pits will be done in the late summer or early autumn.

A Yes.

Q And in your--one of the criteria that we referred to earlier provides and I am quoting. It is item number seven in the list of flood plain criteria.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 "Gravel mining operations
3 in active flood plain deposits will be conducted
4 preferably during the period from late summer to freeze-
5 up and will be governed by sites specific considerations
6 relative to birds, mammals and fish."

7 Now, is the implication
8 of that statement that some of these pits may not be
9 mined in late summer because of those considerations?

10 A I didn't write that, of
11 course, and I don't know what the intent was of the
12 author but I would say that it is pretty, pretty difficult
13 to stockpile gravel material from active flood plains
14 in months other than those listed.

15 Q Well, that--

16 A It is not impossible but
17 it is difficult.

18 Q That is precisely it. It
19 occurs to me that statement, whoever the draftsman was,
20 is perhaps an example of trying to have your cake and
21 eat it too because you've told us and I have no doubt
22 it is correct, that this will be done in the late summer
23 or early autumn but then you tell us that if there are
24 fish, mammal or bird concerns it won't be done in the
25 early autumn and it can't be done any other time.

26 A I would think that I would
27 from a construction point of view would, if we were
28 restricted to harvesting in those situations other than
29 the months that have been discussed that we would first
30 take a serious look at an alternative site.

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1
2 Q I understand that but if
3 there are fish, bird or mammal concerns and if this is
4 your only pit, now those are two big "ifs", you are
5 going to have to mine it in the late summer or early
6 autumn because in practical terms there is no other
7 time to do it, is there?

8 A Well, it can be done, but
9 it would certainly require some explosives.

10 Q Will it not be substantially
11 in engineering terms, uneconomical to do it that way?
12
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Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

WITNESS WILLIAMS: It's

certainly much less economic than doing it in the prime time, but if the alternative is hauling it 150 miles, then it would be economic, Mr. Scott.

Q Well, let's see if I understand. If Dr. McCart, or the mammologist, or the bird men indicate to you that it will be environmentally critical to mine one of these four flood plain pits in late summer-early autumn, you will either have to do it at some other time of the year or by hook or by crook, find yourself an alternative source.

A That sounds reasonable.

WITNESS MCCART: Could I comment that I don't read that particular statement the way you do? I don't see the last clause as qualifying the preceding one, which refers to time. I see it being the end as a co-ordinating conjunction and those two clauses are equivalent. It will be conducted preferably during the period, and you could put a -- during the period from late summer to free~~up~~up. You could put a period there and that mining operations will be governed by site specific considerations relative to birds, mammals and fish. The last clause, as I read this, does not refer to timing at all, it refers to site specific considerations of birds, mammals and fish relative to the mining operation.

Q Well, respectfully I put this question. It doesn't make any difference how you read it, because if the bird man says it will be destructive to birds to mine in the late summer and

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 early autumn, if the bird man says that I take it
2 that it's the posture of Arctic Gas that if alternative
3 sources can be found, it will not mine at that time.

4 A I would say as a fisher-
5 ies biologist, if I were to tell Arctic Gas -- and my
6 understanding is, that if I were to tell Arctic Gas
7 that this is an area critical to fish populations
8 during a late summer and early fall period, that
9 they would then go to another location or choose
10 another site.

11 Q That's precisely as I
12 understand it, what Mr. Williams has said; or they
13 would mine that location, if possible, at a different
14 time of the year. So that the bird, mammal, or fish
15 consideration, if there be one, will dominate in
16 the determination of whether the pit can be mined
17 at that time of year. Is that right, Mr. Williams?

18 MR. MARSHALL: Perhaps ask
19 Mr. Hemstock. He's representative of the applicant.

20 Q All right.

21 WITNESS HEMSTOCK: I would
22 like to qualify that, that there are a great number
23 of factors that have to be considered, and certainly
24 you're going to have to consider what the amount of
25 impact would be, and what the alternative impacts
26 would be. I can certainly see a situation where
27 perhaps the fisheries biologist says that he's
28 greatly concerned about this because there is, say a
29 specific fish population there, and directs us to
30 look elsewhere. We look elsewhere and find that any

Dabbs, Harlan, Hemstock
McCart, Minning, Williams
Cross-Exam by Scott

1 other pit has other environmental concerns, and then
2 it's going to be a matter of judgment and particularly
3 the mitigative measures that we can take before we
4 can decide which pit is open. Certainly there are some
5 of these operations that are going to have some
6 environmental impact.

7 Q Who is going to make
8 those trade-offs?

9 A That's my responsibility.

10 MR. SCOTT: I see.

11 THE COMMISSIONER: Well, should
12 we adjourn for lunch now?

13 MR. SCOTT: Yes.

14 THE COMMISSIONER: All right,
15 we'll come back at two o'clock.

16 MR. MARSHALL: I was wondering,
17 sir, whether or not any of the counsel have further
18 questions for Mr. Dabbs? If not, he wanted to make
19 some travel arrangements.

20 THE COMMISSIONER: Well, make
21 your arrangements then, Mr. Dabbs.

22 (WITNESS DABBS ASIDE)

23 (PROCEEDINGS ADJOURNED TO 2 P.M.)
24
25
26
27
28
29
30

Harlan, Hemstock, McCart
Minning, Williams
Cross-Exam by Scott

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT: Ladies and gentlemen, I wonder now if I could turn to the question of the configuration of the pits on flood plains, and I want to set out one or two propositions and see if they're agreeable with relation to Spread "C". Would you agree, generally speaking, that the planning of a flood plain gravel mining operation involves among other problems two questions:

(1) What outline of plans should be adopted? and

(2) To what depth can the rock be mined?

Is that a fair statement?

WITNESS WILLIAMS: Well, we've kicked around in the last few days this question of depth, Mr. Scott, and I'd like to maybe just add something there to clarify the situation, I think. Miss Minning showed a picture of windrows of gravel in a bar on a flood-plain in Alaska, and it showed that probably the gravel was excavated below the water level of the river because there was water in the bottom of the excavation. But I don't really see that as a problem. There is a dyke around the bar, there is material left in the pit. You take it down to water level or to the unfrozen level where it's free to be taken in trucks, but before you leave it in the wintertime those depressions in the pit that have been caused by pushing the gravel up can be filled from the material in the berm before it's left in the wintertime, and eliminate that ponding situation that was shown. So on a temporary basis I don't see a problem with excavating

Harlan, Hemstock, McCart,
Minning, Williams
Cross-Exam by Scott

1 gravel below the water level in the river.

2
3 Q Well, before we get to
4 that, Mr. Williams, I just want to be sure I understand
5 what is at stake here, and would it be correct to say,
6 whether that observation is right or not, that when
7 you're dealing with flood plains among other matters,
8 there are two critical questions: The configuration
9 of the plan itself and the depth to which you dig?
10 Those are two matters about which judgments have to be
11 made as you approach each flood plain borrow site?

12 A Fine. I was just trying
13 to clarify the depth situation.

14 Q Well, we'll come to the
15 depth, and I'll be grateful to have your views on that
16 but I take it that you agree and the environmentalists
17 insofar as they're concerned agree that there are those
18 two critical questions that have to be approached.

19 MR. MARSHALL: Critical with
20 respect to -- what do you mean by "critical"? Critical
21 with respect to environmental?

22 MR. SCOTT: Significant, key,
23 the outline of the plan and the depth to which the
24 excavation will be taken.

25 A Yes.

26 Q All right. Now, the thrust
27 of the evidence so far in chief and under Mr. Bayly's
28 cross-examination, as I understand it, is first of
29 all, that gravel will not be removed from stream beds
30 in which there is flowing water.

Harlan, Hemstock, McCart,
Minning, Williams
Cross-Exam by Scott

A Yes.

Q And Dr. McCart, I think
you made that point and that may be a quotation from
your evidence. Would you agree that that's a key matter?

WITNESS McCART: That water
will not be removed from stream beds in which there
is active channels?

Q No, that in a critical
environmental area, gravel will not be removed from
stream beds in which there is flowing water.

A Yes.

Q And the second matter
that I draw from your evidence is that in dealing
with flood plains a buffer zone will be left between
the flowing water and the excavation operation.

A Yes.

Q Have I understood that
correctly?

A Yes.

Q And so could I say that
in dealing with flood plain excavations, those are
the two, or those are among the two fundamental
decisions that have been made about how to approach
this problem?

A Yes.

Q And those decisions --

A That's only part of it,
though.

Q But those decisions are
environment-motivated, if I could put it that way.

Harlan, Hemstock, McCart
Minning, Williams
Cross-Exam by Scott

A And there are others.

The berm itself is another environmental consideration.

Q Yes, but those two are critical and are motivated by the environment, the decision that there will be a buffer zone and the decision that you will not dig in flowing water.

MR. MARSHALL: Surely whether they're critical or not depends on all sorts of things.

MR. SCOTT: Well, are they critical? I understood the evidence to be, that from Dr. McCart, that in the rivers with which he's concerned -- and I understand that he may not be concerned with some -- that gravel should not be removed from stream beds in which there is flowing water.

Q Is there any doubt about that?

WITNESS HARLAN: This is critical with respect to fish, in other words; it's not critical with respect to birds.

Q All right.

WITNESS WILLIAMS: Gravel will not be removed from flowing water. Now that was not quite what you said.

Q Well, I may have misread the quotation which is in the canned evidence, page 45, that "gravel will not be removed from stream beds in which there is flowing water."

Harlan, Hemstock, McCart,
Minning, Williams
Cross-Exam by Scott

1
2 Is that the decision?

3 A As long as the interpretation
4 is that the bar that it is to be taken from is not to
5 be construed as stream bed.

6 Q All right.

7 A With flowing water.

8 Q All right. And the
9 second principle which I take it is regarded as
10 environmentally significant is that there will be a
11 buffer zone between the flowing water and the excavation.

12 A Yes.

13 Q Yes. Well now, Dr. McCart,
14 you are familiar, I take it, with Dr. Steigenberger's
15 Report in which he deals with the Malcolm River, I think,
16 among others.

17 WITNESS MCCART: A Yes, I
18 am familiar with it.

19 Q Yes. And he--

20 A But I haven't read it
21 in detail.

22 Q No. He says at page 85,
23 that the streams of the Yukon North Slope are subject
24 to severe summer rain and floods from time to time. And
25 would that be your observation?

26 A Well, you know, if you
27 are looking at the lower, well that is true in a sense,
28 in the sense that upstream in these streams you have
29 essentially one or two channels but when you get down
30 into the sands to the lower portions of these streams,

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1 there is a tendency for the water to spread out.

2 Q Well, you are way ahead
3 of me. I'm asking you first of all if you agree with
4 his observations, that on this slope there are severe
5 summer rains and floods?

6 A There may be. Yes.

7 Q Yes. And do you also
8 agree that there^{are} occasions when the entire flood plain
9 is covered by flowing water?

10 A Well, I think that was the
11 point I was making. If you are working down in the
12 flood plain, in the fans, in the lower reaches of both
13 the Malcolm and its neighbouring river, the fans of
14 both rivers interdigitate and it is not true that the
15 entire flood plain will be covered.

16 Q I suggest--

17 A It depends on which area
18 of this stream you are actually looking at. Are you
19 looking at the single channel areas? Are you looking
20 at the braided areas? Are you looking at the fans^{at} the
21 lower ends of these two rivers?

22 Q I put it to you that
23 what can be said is that portions of these rivers, for
24 a start, that as a result of a summer flood or rain, the
25 entire flood plain may be covered by water from time
26 to time.

27 A Yes.

28 Q Yes. And that also as
29 we get into September and October, they may entirely
30

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1
2 dry up.

3 A Portions, yes.

4 Q Yes. And some of the
5 rivers of the smaller creeks and streams entirely?

6 A Yes.

7 Q Yes. Well now, one of
8 the difficulties is that bearing in mind the criteria
9 that you are not going to excavate in flowing water, I'm
10 not quite sure what one's definition is because, looked
11 at in that context there will be a time when the entire
12 flood plain will be covered by water. There may be a
13 time when it is entirely dry. It seems to me that
14 we must have some better definition to decide what portion
15 is going to be mined and what portion is not. Is that
16 agreed?

17 A Well, I think it certainly
18 is true that there is no intention of taking gravel from
19 active channels. We've established that. And there will
20 be a berm established and there will be a buffer zone
21 between the channel as it is actively flowing at the
22 time that the berm is established. It is true that under
23 unusual circumstances there may be flowing water
24 lapping up against the berm but I think it was established
25 earlier on that the berm hopefully will be built to such
26 a height that even if a flood occurs we are not going
27 to get a breaching of the berm. That's the intention.

28 Q What I am suggesting is
29 that if the definition is merely that you won't take
30 gravel from a bed in which there is flowing water, that

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1
2 simplistic definition, which is what we have so far is
3 going to mean that everything is going to depend on
4 the time you go there to take the gravel unless we
5 go to a more sophisticated definition. Isn't that
6 clear?

7 A Well, I think we could
8 probably define in more sophisticated definition.

9 Q All right. Now, that's
10 what I would like to get, so that I understand precisely
11 what is intended when it is gravel will not be taken
12 from stream beds in which there is flowing water. Now,
13 there have been a number of suggestions. One is to
14 take the mean annual flow or the mean annual flood or
15 the mean August flow and I wonder what is intended.

16 A I think it states that
17 water will not be taken from active channels is what it
18 says and that is what is intended.

19 Q Well, how will--?

20 A Presumably that may mean
21 incidentally that you will have to abandon a
22 gravel pit, if in fact there is a flood and if in fact
23 it becomes part of the active channel, if the berm is
24 breached.

25 Q Isn't the trouble this,
26 Dr. McCart, that what is part of the active channel in
27 August may not be part of the active channel in October?

28 A That's true.

29 Q Well then, everything will
30 depend on whether you go in August or in October?

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A That's true.

Q Unless we have some other definition and what I am suggesting to you and I think this was inherent in the evidence of Dr. Cooper for Arctic Gas and Mr. Lewis, who we called, that some other definition has to be selected in order for that restriction on mining to be meaningful. And the ones I have suggested are the mean annual flow, the mean annual flood, the mean August flow and I suppose there is a variety. So that we will have the assurance that whatever month of the year you go to beginning your mining there will be a standard against which the mining can be judged. Is that not an acceptable approach?

A I think it is. Yes.

Q All right. Well now, Mr. Williams, what is the standard going to be?

WITNESS WILLIAMS: A I guess I'm pretty thick this afternoon. I can't follow that at all. I just don't understand that.

Q Well, let's see if I can explain, because I think it is critical when one comes to the North Slope. If you have a braided river with a number of channels, the channel may be full of water at one point in the year. It may be dried up at another point of the year. The flood plain may be flooded at one part of the year. It may not be flooded at the next part of the year. It is very difficult to tell which is which.

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Do you understand? Is that making any sense ?

3

4

5

WITNESS WILLIAMS: No, not
with respect to taking gravel out of the stream.

6

Q Well let me see--

7

8

A It seems to me entirely
irrelevant.

9

10

11

Q Well let me see if I can
ask Dr. McCart to explain for me again what I thought
he had responded to.

12

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WITNESS MCCART: Well, I think
your contention or your concern is that you want to
be assured that if a gravel operation starts on August
the first, a berm is established and a buffer zone is
established that we have to be, assure ourselves that
on August the fifteenth, if a flood occurs, that the
berm is not going to be breached and that the area
that was formally inactive, outside of the active
channel but on the active flood plain, is not going to
become part of the active channel at some later date.
Is that right? Is that your concern?

23

MR. SCOTT: Yes.

24

25

26

27

28

A And I agree that that is
a concern and we can, we have to assure ourselves that
the berms that we establish are of sufficient height to
withstand what we might consider as a likely storm
event.

29

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Q And isn't the way to do that
to adopt a definition of the active channel which will

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tell you precisely what you mean and give the engineers guidance as to where they may dig?

A Okay, I think this is a question that I can turn over to Dr. Harlan here, who is a hydrologist and familiar with these--

WITNESS HARLAN: Yes, I am having difficulty also in that I find that mean flow in August is a meaningless term and is probably worse than using a definition of an active channel versus an active flood plain, particularly with regard, when we are talking to active flood plains.

MR. SCOTT: Well let me ask you this. What do you mean when you say active flood plain on the North slope?

A We are using the traditional definition of active flood plain. It is the area adjacent to a stream which is flooded periodically.

Q Yes, but what I have suggested is that on the North slope you may have an area that is flooded periodically and you may have areas that run water for nine months of the year which dry up. How do you distinguish one from the other when you come on the spot?

A Isn't this the characteristics of a braided stream?

Q Well, I am asking you, how do you--

A Yes, it is.

Q Let me put it this way. If

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1
2 you go to the North slope and deal with a small creek
3 in October, let me ask you to assume that this, that in
4 October was dried up. That would not be unheard of
5 would it?

6 A We'll make those assumptions.

7 Q All right. Now, how do you
8 decide there where the active flood plain is and where
9 the bed of the creek is?

10 WITNESS WILLIAMS: Can we
11 attack it from a different angle and go through the
12 procedure?

13 MR. SCOTT: Well I would like
14 to hear Dr. Harlan's answer first.

15 WITNESS HARLAN: There is no
16 active channel.

17 MR. SCOTT: Precisely. So/if ^{that}
18 one goes in August there will be nothing that will
19 prevent one from saying, well there is no active
20 channel here so we are going to mine, in theory, I know
21 you wouldn't do that?

22 A In theory, yes.

23 Q Yes. So don't you agree
24 Dr. Harlan that some attempt has to be made if this is
25 to be a matter of policy that will enable us to judge
26 what is intended by this general expression that gravel
27 will not be removed from stream beds in which there
28 is flowing water?

29 A I would think that policy
30 still applies, if you are dealing with braided rivers and

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your going to develop a gravel area, you would still develop you berms around this to protect and prevent any siltation from it.

Q Well before we turn to Mr. Williams, let me put this example. You tell the contractor to go out and dig the quarry and you say the first principle is that gravel will not be removed from stream beds in which there is flowing water and he goes out in October and there is no flowing water at all, because of the month of the year and the circumstances in which he goes. Now what, how is he to know what to do?

A He has got a development plan to go by. He is going to start probably with aerial photographs and pick a bar that does not have a channel between the bar and the main bank and that is where your equipment is going to be, going to be parked and so you could move on to the bar, from the bank without going through an active channel and you proceed to push up your dykes and then push up the gravel, but he has got a location plan to work from. I am just having real trouble with this problem.

Q Well can't it be recognized that that very bar where you place your-- Let's assume you move your equipment in in January and you place your equipment on a bar, when you did photographs the previous September was dry--

A I wouldn't put it on a bar
on the wintertime, I would put it on the bank above the

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1
2 bar.

3 Q All right. Well you have
4 picked out the bar?

5 A Yes sir.

6 Q All right. How can you be
7 sure that you have isolated the areas over which water
8 will not be flowing?

9 A There's no way you can be
10 absolutely sure, no.

11 Q Yes. Well, isn't it
12 possible to strive for a more precise definition by
13 measuring the flow over a number of seasons and seeing
14 precisely what happens to the flow of water on a given
15 river?

16 A I suppose if you took the
17 worst case, you could never get started.

18 Q Oh, I am not asking / you that
19 should take the worst case but I am suggesting that you
20 should not take a case and impose a definition which is
21 meaningful at some times of the year and not at the
22 other. Is it not possible to find a optimum definition
23 that will allow you to mine and which will give an
24 assurance that you will be good to your word that
25 gravel will not be removed from stream beds in which
26 there is flowing water?

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1 A I'm still
2 having great difficulty. If you take a one in 50-year
3 flood, it may have a given volume, just assume this.
4 The water level that results from that during different
5 years with the same storm may be completely different.
6 This is the nature of the braided rivers.

7 Q All right,^{well}/then how do
8 you select where to dig your gravel? Why don't you
9 simply go to the busiest part of the braided river and
10 dig?

11 A You're avoiding the active
12 channels.

13 Q Well, let's go at it
14 another way. I take it first of all that if you
15 develop your pits late enough in the year you will not
16 at the time of the development of those pits mine
17 in or across the channel.

18 A Yes.

19 Q And you will not mine
20 even though there is no longer a stream bed with
21 water in it.

22 A Yes, I would agree with
23 that.

24 Q Well now, how are you
25 going to make that decision? You arrive in October,
26 you can see there was a river there all summer. It's
27 not there now. How are you going to decide where to
28 mine?

29 A First of all it's based
30 upon on-site inspection. This is over a period of time

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1 prior to the initiation of operations.

2 Q That's exactly what
3 I'm getting at. All right, it's based on a view of
4 that river over a period of time before the mining
5 begins. Right?

6 A That's correct.

7 Q What period of time?

8 A Well, we're observing
9 the rivers now, so I assume it would be from now
10 until the time of operation.

11 Q Well, do I understand
12 then that you are going to try and/or in the course
13 of developing a sort of profile for all these rivers
14 in which there will be mining that will show where
15 the water has gone at various seasons of the year over
16 various years?

17 A No, I don't think we
18 would.

19 Q Well, what do you propose?

20 A I don't think that would
21 be a meaningful exercise.

22 Q Well, what do you
23 propose?

24 A Basically just observations
25 of patterns of channel migration.

26 Q When?

27 A The meaningful time is
28 just prior to initiation of pit operation. There's a
29 great deal of observations available on the behaviour
30 of alluvial fans in braided rivers.

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1 Q Well, again back to my
2 example, and I think I'll spend some time on it
3 because I may be wrong but I think it's important.
4 If you've decided that you're going to mine on a
5 river and you turn up there in October and there's
6 no water there, how are you going to decide where to
7 dig?

8 A This is based on the
9 existing profile across the river.

10 Q Well --

11 A You can isolate bars and
12 what were the active channels.

13 Q -- so you are going to
14 look at the ground and determine from that examination
15 where the water last flowed?

16 A Yes.

17 Q Yes, and are you not
18 going to do any other preparatory work?

19 A For the season of the
20 year in which we were going to do the gravel mining
21 operations we would know what the flood plain distri-
22 butions would be in order to design the dyke system
23 around this. So that is preparation for this.

24 Q Apart from your visual
25 inspection before you put the backhoe in, what else
26 are you going to have to tell you where to put the
27 backhoe?

28 WITNESS WILLIAMS: With
29 photography and a detailed on-site inspection, and
30 there was a good example on the slides that were shown

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1 of the braided stream, where it would appear that
2 there was probably a very minor channel in the flood
3 season between the main bank and a very good sized
4 bar; but in August there is either no flowing water
5 there or no water at all. If the water is not flowing,
6 I'd move the equipment across the dead water and pro-
7 ceed with the dyke construction, and I would dyke
8 off some channels that would normally have flowing
9 water in the springtime. But the berm is going to
10 prevent that water from flowing.

11 Q Will you dig in channels
12 that would normally have flowing water in the spring-
13 time?

14 A Yes, as long as it was
15 contained within the bermed area.

16 Q I see. So we may conclude
17 then that as long as they're within the bermed area
18 you will be prepared to dig gravel in channels that
19 contain water in the spring and perhaps even in the
20 summer.

21 A I'm talking about minor
22 channels now. These braided streams have various
23 sizes of channels. I'm not talking about a major one.
24 I'm talking about a minor one that just has flowing
25 water in flood seasons, in flood times.

26 WITNESS HARLAN: We should
27 add one piece of information there. It's a continuation
28 of the question you asked me, there would be a great
29 deal of environmental information in terms of the fish
30 migration routes, the timing of the year, and also

Harlan, Hemstock, McCart
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1 other animals. This is a piece of information we
2 would have prior to initiation of a borrow operation.

3 Q Well, I'm sorry, perhaps
4 I misunderstood you. I thought that the fundamental
5 definition, which was that you would not remove gravel
6 from stream beds in which there was flowing water
7 meant that you would not remove it from stream beds
8 in which at any time of year there was flowing water.

9 A No.

10 WITNESS WILLIAMS: If it was
11 that simple we should have clarified it at the
12 beginning. The intent is not to be baling water, baling
13 gravel out of flowing water to increase the downstream
14 siltation load; but if they're not contained within
15 the dyke and not flowing, --

16 Q So that if you come upon a
17 creek that is dried up in October, as long as you can
18 build your dykes you can dig out the bottom of that
19 creek.

20 A Yes.

21 MR. MARSHALL: I don't know
22 that they're talking about taking anything out of
23 creeks.

24 WITNESS McCART: Let me point
25 out the ones that are dry in the winter, the creeks
26 that are dry in winter are what we classify as tundra
27 streams, and there are no flood plains, or well, the
28 basic flood plains, basically the gravel sources that
29 we're talking about are on braided streams and not the
30 sort / which you have on a single channel.

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I want to make one other point.

If you, if by not removing water from channels that
may be existent at any time of the year by definition,
you can no longer remove gravel from anywhere on an
active flood plain because that's what an active flood
plain is, it's the area which may at any time of the
year, or in some year have water across it.

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1 Q What's your definition
2 for the purposes of these rivers of active river
3 channel from which you will not take gravel?

4 WITNESS HARLAN: Well, using
5 just the geomorphic definition, it is the channel in
6 which water is flowing.

7 Q .Based on observation.

8 A Based on observation

9 Q And if it's not flowing
10 because it's dried up, you'll take gravel from there
11 anyway.

12 A We could.

13 Q Yes, notwithstanding that
14 it will be flowing the balance of the year.

15 A That's not our intention.

16 Q Well --

17 A In other words, there
18 are defined channels, even though water is not flowing.

19 Q -- what I thought --

20 A It is not our intention
21 to go to these channels, even though there isn't
22 water. It is to the bars between these channels.

23 Q Well, what I think I'm
24 getting at is that without a definition on the North
25 Slope, the expression, "active river channel" can mean
26 virtually whatever you want it to mean.

27 MR. MARSHALL: Well, Mr.
28 Scott, I don't think that's fair to the witnesses.
29 They defined what they meant.

30 MR. SCOTT: All right. Is that

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1 an unfair statement?

2 WITNESS WILLIAMS: I thought
3 it was very clear that the intent of the statement was
4 to say that we wouldn't be having a dragline sitting
5 out there and baling gravel out of a flowing stream,
6 it's just that simple.

7 Q But what I am getting
8 at is this, on the Mackenzie River, and I suppose even
9 I, if I looked at it carefully, could tell you where
10 the active river channel is and where the flood plain
11 is, and it would be relatively easy to say, "We're
12 not going to mine in the active river channel." There
13 would be some experience and some expertise that would
14 tell us where that was. Now what I'm putting to you
15 is that while that definition may be entirely satis-
16 factory on a standard river, it's a meaningless defini-
17 tion when you come to the North Slope and braided
18 rivers. Dr. Harlan?

19 WITNESS HARLAN: I guess we're
20 going to throw out geomorphology.

21 Q Well, what is the
22 definition of "active river channel" for a North Slope
23 river?

24 A It becomes a very
25 difficult thing to define. We have taken the
26 definition which conforms to many of the geomorphic
27 dictionaries,

28 Q Which is?

29 A The active channel is
30 defined as that area in which there is flowing water.

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1 Q At what season of the
2 year?

3 A It's not defined in
4 definitions.

5 Q Yes, and that's going to
6 make all the difference if you go to the North Slope
7 in October, isn't it?

8 A I hardly see our operations
9 commencing in October.

10 Q Well, in September, late
11 September.

12 A Well, late September,
13 probably right now, these channels are well-defined.

14 Q I see. Do you gentlemen
15 think it would be helpful at all to have any other
16 kind of definition for the North Slope that was based
17 either on some kind of flow or on identifiable ground
18 features of some type.

19 A Would you be more
20 specific in terms of the type of flow?

21 Q I'm letting you select
22 of the various kinds of flow, one that you think pro-
23 vides a suitable definition.

24 A I would be very hesitant
25 to use the kinds of flow to define what is the active
26 channel.

27 Q So what we're left with
28 is this, that all that can be said is ^{that} when you go to
29 mine on the North Slope you will not take gravel from
30 an active river channel, and an active river channel

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1 is a channel in which there is water flowing, at the
2 time you turn up.

3 A Yes, I believe that's
4 true.

5 Q All right. Now Dr.
6 McCart, just to pursue this matter one step further,
7 if you were a regulating agency, dealing with the North
8 Shore, how would you define "active river channel" for
9 the purposes of regulation? Do you accept the
10 definition that Dr. Harlan has given?

11 WITNESS McCART: Well, an active
12 river channel is a channel in which there is flowing
13 water, by definition as far as I'm concerned. I'm more
14 concerned about the environmental aspects of it, of
15 course. I want to be assured that wherever the gravel
16 came from it was a very, very, very low probability
17 that any environmental damage as far as populations
18 of organisms would occur.

19 Q I see.

20 A I think we can define
21 that for a large number of the North Slope streams.

22 Q I understand that that's
23 your concern. I'm simply asking if you were a regulatory
24 agency, would you impose on that definition any particular
25 time of year?

26 A Well, I think probably
27 I would impose it at the time of year at which the gravel
28 was being taken, yes.

29 Q All right, and I take it
30 that in a critical -- let us assume an environmentally

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1 critical river, as far as you're concerned, you would
2 have no reservation if it is low or if it is dried up
3 -- well, let's say if it is low -- in October of mining
4 in any place where there is no water running.

5 A Well, let me tell you
6 something about braided rivers. In the very heavily
7 braided portion of these rivers you have a great deal
8 of migration. They change radically from one year to
9 the next. Now these are, from the fish point of view,
10 the only point of view that I would like to discuss,
11 from the fish point of view are very unlikely areas
12 for overwintering and spawning, simply because the fish
13 would never be assured, you see, they're very unlikely
14 to develop a habit of coming back to these areas simply
15 because they're so highly variable. So from my point
16 of view, the important thing is to define the critical
17 areas from the point of view of populations of fish
18 and normally they do not occur in the fans or in
19 highly braided segments of streams, except where there
20 are groundwater springs, because the groundwater springs,
21 the aquifers don't change to any extent, they're peren-
22 nial, they're there year after year; but as far as the
23 channels themselves, they're highly variable and, as I
24 say, from the simple point of view of survival, there
25 would be selection against any population of fish which
26 chose that, or chose to return to that area.

27 Q Well then, am I correct
28 in inferring that as a fish biologist you are not
29 concerned about this problem of dredging gravel, provided
30 that
/ it is not in an area that you regard as critical for fish?

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1 A Well, I am concerned
2 about dredging gravel, which by definition, as far as
3 I'm concerned, is removing it from an active channel.
4 We don't want that.

5 Q I'm sorry.

6 A I have no objection to-
7 take the Firth-Malcolm area, for instance, there are
8 approximately 60 square miles of braided fan in that
9 area, and I'm sure that within that enormous area we
10 can find areas where gravel can be removed quite
11 safely from what you would define as the active flood
12 plain; but from areas which may not be flooded except
13 you know, at infrequent intervals, and within many
14 of these braided streams there are many areas exactly
15 like that.

16 Q All right. Well let's
17 pretend again that you're the regulating agency and
18 you tell me in terms the instruction that you are going
19 to give to a company that wishes to get gravel from
20 such an area.
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1
2 A From the fisheries'
3 point of view, I would tell him to go in and look at
4 the distribution of fish at the time of year that they
5 would expect to be taking the gravel and I would have
6 them me that sedimentation, or whatever is unlikely to
7 affect fish distributed as they are at the time the
8 gravel was going to be removed.

9 In other words, if there
10 is a flood, I think I would to be assured okay that
11 there is not going to be excessive sedimentation if a
12 flood occurs.

13 Q Yes. Well, would you --
14 are you saying that-it doesn't seem to me that that is
15 capable of being a regulation-- Are you saying in
16 essence, that from the fish point of view and environmen-
17 tal impact assessment has to be made at the time of
18 each selection?

19 A As part of the mining
20 plan if you want to call it that, I think you would have
21 to include an entire mental impact assessment as was
22 stated earlier.

23 Q And, it has to be made,
24 I take it, the impact assessment has to be reasonably
25 current?

26 A Reasonably, yes.

27 Q Within a year?

28 A Not necessarily. As I say
29 that the critical areas are the areas that are used
30 year after year.

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1
2 Q And I take it, Miss
3 Minning, from your discussion of site plans this morn-
4 ing that that kind of information is going to be
5 provided on the site plans before, that you earlier
6 described?

7 WITNESS MINNING: A Yes.

8 Q It has come to the depth.
9 Not I am not clear from what Mr. Williams had to say
10 whether we are going to excavate below the water level
11 or not. What is the position on that?

12 WITNESS WILLIAMS: A What I
13 said was that I couldn't see any problem with excavating
14 below the water level providing that the depressions
15 that are formed are filled in before leaving the site.

16 Q Dr. McCart, what do you
17 have to say as to that, speaking generally with respect
18 to--

19 WITNESS MCCART: A I think
20 I have already commented on this. 'Our major concern
21 is that if they are excavated so that some ponding
22 occurs we want to be assured that the berms continue
23 so that fish can't enter these areas. And that certainly
24 they be filled in so that ponding doesn't occur. Our
25 major concern, I might add, is with the small fish,
26 particularly grayling, which have the tendency to get
27 trapped in ponds areas not levelled.

28 Q So, I take it that you
29 have no objection to excavating below the water level
30 provided that the berm is adequate to prevent the

Harlan, Hemstock, McCart,
Minning, Williams
Cross-Exam by Scott

1 admission of fish and secondly, he has provided that it
2 is filled up to water level.
3

4 A What we would have an
5 objection to is if the ponding were not incorporated.
6 I think that we have certainly stated in the past that
7 we do not want these ponds excavated below the water
8 level so that ponding occurs. With the berm if it is
9 complete berm it is not critical, as long as the fish
10 can't get through the berm into the ponds prior to the
11 time they are filled in.

12 Q I take it though that
13 you want the ponds filled in?

14 A We want the bar level
15 so that ponding does not occur which might entrap fish.

16 Q Yes, but when the gravel
17 has been excavated. Let's say 10 feet below the water
18 level, and the borrow has been in place --

19 A Okay, obviously you might
20 have a problem if the berm--if there is water up
21 against the berm at the time that the berm is pushed into
22 the pits which have been excavated. So you would have
23 to be ensured that there was a buffer zone so that
24 water could not enter the pit as the berm was being
25 pushed back in to fill up the pit.

26 Q All right. But just so
27 I am clear. You want the pit filled in to water level?

28 A We want the pit filled
29 in so that the surface of the pit is going to be --
30 I can see a problem arising here--we want to be

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Minning, Williams
Cross-Exam by Scott

1
2 ensured --Yes, we want the thing levelled. That is the
3 important point.

4 Q Level with what?

5 A Level so that even if the
6 water rises at some point in time and falls, we are
7 not going to have ponds forming, even during the course
8 of a subsequent flood. I think that is the important
9 thing here from our point of view.

10 Q In other words, what you
11 want is you want it flat?

12 A That is right. Yes.

13 Q In any event, isn't it
14 true that this whole discussion in a sense is Alice
15 in Wonderland because ^{when you} talk about excavating below
16 the water level, again it becomes a question of when
17 you excavate because the water level varies so greatly?
18 So that all the talk the other day about excavating
19 above or below the water level is really meaningless,
20 isn't it? Because the water level varies from day to
21 day. Isn't that correct? If there is a heavy rain,
22 the water level varies. I think you have to say yes
23 or no.

24 WITNESS HARLAN: A Yes, that's
25 correct.

26 Q So that there will be no
27 assurance to anybody of the viability of the situation
28 if it is asserted that we will not excavate below
29 the water level?

30 WITNESS MCCART: I think

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Minning, Williams
Cross-Exam by Scott

1
2 probably it is more important that we define it as
3 being level so that at any subsequent water level,
4 you are not going to get ponding.

5 Q All right. So we can
6 leave all this water level stuff to one side because
7 it is of no assistance, is it, Dr. McCart?

8 A Well, I hesitated in
9 answering your question initially because I think the
10 first part of the question you suggested it was meaning-
11 less. I wasn't ready to admit that immediately.

12 Q You are now, aren't you?
13 Aren't you now?

14 A I think that is a better
15 idea--level.

16 WITNESS HARLAN: A I think
17 it is a fair to point out though that the range of
18 water levels on many of these braided streams--the
19 range of fluctuations is not great. So although, you
20 make a statement, "We are not going to excavate below
21 water level or below one or two feet below water level."
22 It is not suggesting that we are going to have twelve
23 feet of water at that point at some time.

24 Q No, but the assurance
25 given on day 1 that we will not excavate below water
26 level is meaningful to me when I consider that the
27 Humber River but it has no meaningful implications in
28 Northern Canada, does it?

29 MR. MARSHALL: I don't think
30 they were saying that they weren't going to excavate

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below --

Q It is right in their
canned evidence.

I am not criticizing it.
I think the solution that Dr. McCart has suggested is
the appropriate one that the matter be dealt with by
rendering the thing flat.

WITNESS McCART: A Well, it
does say regraded to ensure positive downslope grading
through the stream base so that no ponding will occur.

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Minning, Williams.
Cross-Exam by Scott

1
2 MR. SCOTT: Q The Department Of The
3 Environment had a task force that dealt with some, that
4 made / some submissions which had been filed on some of these
5 matters and on page 19, paragraph 18, they say this
6 and I would like to read it in full, "The removal of
7 borrow material or gravel from river to lake systems
8 can have serious environmental consequences including
9 the destruction of fish spawning grounds, the intro-
10 duction of debris, increases suspended sediment levels
11 and the disruption of spring^{and}/ground water flows,
12 diversion of stream flows or disruption of fish
13 migrations. A detailed and sites specific discussion
14 of environmental concerns arising from the applicants
15 proposed borrow operations is presented in the Assess-
16 ment Group's report section 8.3". And then this in-
17 dented in^{the}/ form, I take it as a recommendation, "Borrow
18 removal operations should be limited to areas above the
19 designed flood high-water stage and no closer than
20 three hundred feet or one hundred metres from any active
21 river channel . If the applicant wishes to remove
22 gravel from below design flood, high water stage or
23 three hundred feet of an active river channel, fisheries
24 and marine service must be consulted . If when
25 fisheries and marine service is satisfied that a stream
26 does not support or has the potential to support
27 significant fish populations, then permission may be
28 given for excavation and removal of riverbed
29 material . Such permission will be dependent upon
30 removal operations being conducted in a controlled manner

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1
2 and subject to approval of a fisheries officer". Now,
3 in the first place that refers to a Fisheries Department
4 regulation, does it not with which you are familiar
5 Dr. McCart?

6 WITNESS MCCART: Well, it
7 sounds like-- Yes, there are similiar interpretations
8 of the Fisheries Act which indicates all sorts of things.

9 Q Now, is it going to be
10 possible on the North slope to comply with that
11 Fisheries Department regulation that removal operation
12 should be limited to areas above the design flood high-
13 water stage and no closer than three hundred feet or
14 one hundred metres from any active river channel?

15 A It wasn't clear to me Mr.
16 Scott if that is the regulation or all of what you
17 read was the regulation?

18 Q No that is, as I understand
19 it, the regulation.

20 A There is an additional
21 provision requiring you to get approval--

22 Q It is a guideline.

23 A Well, I would like to have
24 Mr. Harlan tell me what a design flood high-water
25 stage is in relationship to a borrow operation if he
26 can?

27 WITNESS HARLAN: I would like
28 to know what the fisheries have defined it as?

29 Q But I take it, it is
30 perfectly clear that the proposal for the, whatever

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Minning, Williams.
Cross-Exam by Scott

1
2 design flood high-water stage may be defined as and
3 bearing in mind you must be no closer than three
4 hundred feet from that level, it is perfectly apparent
5 that the proposals for spread C, do not meet that
6 requirement.

7 A Would you read the second
8 half of that guideline please?

9 Q Yes. "Borrow, removal
10 operations should be limited to areas above the designed
11 flood, high water stage and no closer than three
12 hundred feet or ^{one}/ hundred metres from any active river
13 channel".

14 A Continue on would you please.

15 MR. MARSHALL: What is the
16 rest of what you are recording?

17 MR. SCOTT: Well the task
18 force comment.

19 MR. MARSHALL: Have you got
20 a copy of that so we can follow along?

21 MR. SCOTT: It is an exhibit.

22 MR. MARSHALL: What is the
23 exhibit number please?

24 MR. SCOTT: I don't know. I
25 can provide the guidelines themselves to the panel
26 and it is interesting that D.O.E. has quoted them--

27 MR. MARSHALL: These are
28 guidelines, recommendations or regulations?

29 MR. SCOTT: They are guidelines.

30 MR. MARSHALL: Maybe Mr. Scott

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Minning, Williams.
Cross-Exam by Scott

1
2 can help us. If these are the guidelines that were done
3 in December, our information is they have been updated
4 several times since then and we are wondering whether
5 or not these are current.

6 MR. SCOTT: As far as I know
7 they are.

8 MR. MARSHALL: I would like
9 the witnesses to have in front of them the exhibit that
10 Mr. Scott is referring to and --

11 MR. SCOTT: Well surely they
12 are better off to have the guideline, than the summary
13 of it, but if they want the exhibit, they can have it.

14 MR. COMMISSIONER: Well let's
15 adjourn for coffee and the witnesses can examine the
16 guidelines.

17 (PROCEEDINGS ADJOURNED FOR AFTERNOON RECESS)
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. MARSHALL: I wonder, sir, if you could assist us with respect to the guideline that you were discussing. I believe you gave the witnesses a two-page document issued by the Department of the Environment, Fisheries & Marine Service, entitled:

"Guidelines for the Protection of the Fish Resources of the Northwest Territories During Highway Construction and Operation, " by Dryden & Stein, is that what we are to be looking at?

MR. SCOTT: Yes.

MR. MARSHALL: That's not an exhibit, as I understand it. There was another matter that you or someone else -- Dr. Fyles, I guess referred to me too -- and that's the Department of the Environment Report of April 1, 1975, the covering letter being signed by Mr. Zoltai.

MR. SCOTT: I read that.

MR. MARSHALL: That's what you're reading from?

MR. SCOTT: Yes.

MR. MARSHALL: And I understand there is another D.O.E. guideline, and I am instructed that as far as Arctic Gas knows, this is the D.O.E. Pipeline Guideline, it's dated -- the second draft is dated July of 1975.

MR. SCOTT: Well, that's fine. All I'm saying is the Zoltai or the Task Force Report

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1 I understand was not made an exhibit, but it was
2 circulated, if you will recall, Mr. Commissioner, to
3 all counsel at the time, now some months ago, when the
4 Department of the Environment undertook to make it
5 available to the participants in the Inquiry. I have
6 no objection to a copy of it being marked as an exhibit
7 if that is desirable. I have no objection to the guide-
8 line from the Department of the Environment being
9 marked as an exhibit, and if Mr. Marshall has any other
10 exhibits, that's fine with me, too.

11 MR. MARSHALL: Well, Mr. Scott,
12 perhaps you could get some clarification for us. The
13 Dryden & Stein document under paragraph 2 deals with
14 gravel removal and the wording seems to differ from
15 the Zoltai Report at page 19. The difference, if my
16 quick reading of it is correct, is that the indented
17 portion in the Zoltai document seems to be the guide-
18 line, whereas it's been expanded in the other document
19 to include the last paragraph on page 19 of the Zoltai
20 document.

21 MR. SCOTT: Well, that's why
22 I suggest, Mr. Marshall -- I think you're correct about
23 that -- that's why I suggest that the panel might look
24 at the guideline itself.

25 MR. MARSHALL: Which one, from
26 the Zoltai ?

27 MR. SCOTT: The guideline I
28 put before them -- no, the Zoltai document is not-only
29 incorporates the document, it's the Task Force Report
30 in which reference is made to a guideline. I think it

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Cross-Exam by Scott

1 would be more helpful if the panel looked at the guideline
2 itself, which is the --

3 MR. MARSHALL: The one dealing
4 with the highway construction?

5 MR. SCOTT: Yes, well it
6 deals with borrow.

7 MR. MARSHALL: Well, I'm told
8 that the guideline in the document that I referred to,
9 dated July of 1975, with respect to borrow pits is
10 different.

11 M R SCOTT: Well, that may be
12 so, Mr. Commissioner, but --

13 MR. MARSHALL: This is the
14 one dealing with a gas pipeline, so I'm wondering where
15 we're supposed to be looking at.

16 MR. SCOTT: Well, surely I can
17 conduct my own cross-examination. The Department of the
18 Environment has prepared guidelines respecting borrow
19 that may be taken for the highway. That's the guide-
20 line, taken from rivers. That's the guideline that
21 I have put before the panel and I'd like to ask them
22 about it. There may be other guidelines and Mr.
23 Marshall --

24 MR. MARSHALL: I just wasn't
25 sure what you wanted.

26 MR. SCOTT: -- in re-examination
27 can deal with those.

28 Q Now I take it, referring
29 to that guideline, and referring for the moment to
30 the first sentence of it, that the proposal of Arctic

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1 Gas at least on the Yukon slope, will not be able to
2 comply with that first sentence.

3 THE COMMISSIONER: Excuse me,
4 what was the first sentence again?

5 MR. SCOTT: The first sentence
6 reads:

7 "Gravel removal operations should be limited
8 to areas above the design flood high water
9 stage and no closer than 91.4 meters 300 feet
10 from any active river channel."

11 WITNESS HARLAN: I don't know
12 whether we can say whether we can comply with that
13 or not. We have to know what the design flood high
14 water stage is as it pertains to a borrow pit.

15 Q But Dr. Harlan, you've
16 admitted that you can take water from an active river
17 channel provided there was no water in it. Now surely
18 that means that you won't be taking it more than 300
19 feet from that location, no matter what the design
20 flood high water stage means.

21 A It has a completely
22 different meaning as it pertains to highway construction,
23 as to borrow operations.

24 Q Let me ask you, please
25 don't worry about whether these guidelines were prepared
26 for a highway. They have to do with the selection of
27 borrow from rivers and I want to ask you if it is
28 apparent, as I think it is, that you cannot comply or
29 you do not propose at the moment to comply with this
30 first sentence of that guideline. It may have no

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1 application to you, but I take it that you can't
2 comply with it.

3 A We would have to go
4 off the active flood plains for a braided river, yes.

5 Q In other words, it is
6 fair to say, is it not, that the four flood plain
7 sites on Section C, cannot as proposed, meet the first
8 sentence of this guideline?

9 A Yes, that's fair to say.

10 Q Well now, one other
11 question at the Malcolm River, which is shown on this --

12 THE COMMISSIONER: Could I just
13 ask a question here?

14 Q The fact that those
15 guidelines were prepared for taking borrow for a high-
16 way and you are taking borrow for a pipeline, doesn't
17 have any significance at all, does it, in considering
18 the merit of those guidelines as they apply to the
19 braided rivers? There is nothing in that, is there?

20 A Well, it relates to
21 design flood.

22 Q I see.

23 A Dr. McCart would also
24 like to comment.

25 WITNESS MCCART: I'd like to
26 comment that Dryden & Stein in preparing this document
27 were thinking about, I think, a highway such as the
28 Mackenzie Highway, and this kind of -- along the course
29 of the Mackenzie Highway there is nothing that we
30 would classify as a braided stream in the sense that

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1 we have braided streams along the North Slope. I
2 should point out that this 300 feet that's mentioned
3 here is a distance that is often mentioned in guidelines
4 for construction of roads and gravel removal and other
5 operations in forested areas and in logging operations,
6 because / ^{this} provides a lead strip between the area
7 in which the work is taking place in the stream, and
8 in most instances you have a down slope and this isn't
9 the same situation that we have when we're taking
10 gravel from a braided stream and I'd say that these
11 particular guidelines are not terribly relevant to
12 the situation that one has in a braided stream on the
13 North Slope as opposed to the situation that you have
14 along the Mackenzie Valley where you're constructing
15 a highway.

MR. SCOTT:

16 Q Well, if Arctic Gas wants
17 a lawyer to get them out from the regulation, I volunteer
18 that defence is not that they're highway guidelines. The
19 defence is that they don't apply to the Yukon.

20 A It's not a regulation,
21 is it?

22 THE COMMISSIONER: Well, leaving
23 that aside, let's not worry about whether it is the
24 force of law, we're not concerned with that at this
25 point. The point you're making is that it doesn't
26 apply to the North Slope of the Yukon.

27 A It is the appropriate
28 sort of guideline for the Mackenzie Valley, but it is
29 not appropriate to braided streams on the North Slope
30 at all.

Harlan, Hemstock, McCart
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Cross-Exam by Scott

1
2 WITNESS HEMSTOCK: We would
3 certainly expect to comply by the D.O.T. pipeline
4 guidelines which we have seen in draft form.

5 MR. SCOTT: Well, I've pursued
6 that. Now let's come to the Malcolm River. The Mal-
7 colm River is a river in which you say that there is
8 2.5 million cubic yards of gravel of some kind avail-
9 able, and I gather from looking at your route sheet
10 that you intend to take a million cubic yards, more or
11 less, out of that river. Would those figures be
12 roughly correct? I only need rough, rough figures
13 for this example.

14 WITNESS MINNING: Yes.

15 Q Yes. All right. Have
16 we any way of guessing at the moment how deep that
17 pit is going to be in the flood plain of the Malcolm?

18 WITNESS WILLIAMS: Well, on
19 page 46 of the testimony, Mr. Scott, I think I read it
20 a little differently from what you did a little while
21 ago. Where it says:

22 "The borrow excavation will not be deeper
23 than the level of the adjacent stream bed."

24 Now that's not water level, that's the bottom of the
25 deepest stream bed.

26 Q I'm off on another
27 problem now, Mr. Williams. I'm not worried how it's
28 going to relate to the water level. I simply want you
29 to tell me in order to get your million cubic feet,
30 roughly how deep do you think the pit will be? I

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Cross-Exam by Scott

1 presume it's not going to be one foot. I presume it's
2 going to be six feet or ten feet or something, isn't
3 it?
4

5 A I'm not sure in that
6 area how high the bars are above the normal stream
7 flow, or above the bed of the deepest channel. But
8 when you talk about excavating in ten feet of water,
9 that certainly isn't the intent. The intent is some-
10 thing similar to what was shown on the slides where
11 dozers push up the gravel into stockpile sites, so
12 it would be -- the water in the bottom of the pit
13 would be a limiting factor.

14 Q You're away ahead of
15 me, Mr. Williams.

16 A I'm trying to answer
17 your question.

18 Q Well, perhaps we can
19 do it this way. Look at the responses at page 125,
20 the recovery depth is shown as 10 feet, so I take
21 it from that that you're going to be digging into a
22 depth of ten feet, more or less.

23 WITNESS MINNING: You might
24 use less for depth and a wider area.

25 Q All right, but is ten
26 feet the maximum, more or less, for purposes of dis-
27 cussion?

28 A I think that was decided
29 on the basis of the equipment used in this sort of
30 thing. It's not practical to go much deeper than ten

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Minning, Williams
Cross-Exam by Scott

1 feet in that sort of a deposit.

2 Q All right. Well now
3 you're going to build a berm around this, as I under-
4 stand, Mr. Williams, so the fish won't get in and so
5 on.

6 WITNESS WILLIAMS: Yes sir.

7 Q Yes, and then you're
8 going to push that berm into the cavity.

9 A Yes.

10 Q Well, then how are you going
11 to flatten it out? You've taken a million cubic yards
12 out and you've pushed a berm into it. How are you
13 going to flatten it out without bringing some more
14 material to put in that cavity?

15 A If you have excavated to
16 a depth that there is two to three feet of water,
17 say in the bottom of the pit, it's my opinion that there
18 will be enough material from the berm to bring that
19 up to a level situation where there won't be any
20 ponding; but because the strip map shows one dot on
21 the map, I don't think that's indicative it will come
22 out of one pit. I wouldn't see -- I would see several
23 pits within that area on gravel bars. It's not
24 necessarily one large area that the million yards would
25 be taken from.

26
27
28
29
30

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Minning, Williams
Cross-Exam by Scott

1
2 Q We are now in the
3 CAGSL responses in Appendix, A in the section that deals
4 with special criteria for gravel borrow pits and flood
5 plains, items one and two discuss special studies in
6 very broad terminology--the special studies that will
7 be required.

8 And I would just like
9 to get a check list of the kind of things that we are
10 going to know when these site location plans are
11 presented for such gravel pits. And could I just read
12 down a check list and if I come anything that you are
13 not going to be able to tell us when you set forth the
14 specification, you let me know, you stop me.

15 Proximity of fish,
16 spawning, feeding nursery and over-wintering areas; times
17 of fish migration and spawning near the site; the
18 size and significance of fish population; the use by
19 man of fish resources in that particular system; for
20 birds, breeding and staging areas; for mammals and for
21 particularly moose, willow stands and so forth for
22 their winter ranges; with respect to ^{the} rivers themselves
23 the slope of the water surface; the valley cross-sections;
24 the description of bed and bank materials; the flood
25 potential; the normal flow regime; the suspended load;
26 the bed load; the ground regime in the river valley;
27 the potential for icings; the evidence of aggradation or
28 degradation; and whatever material can be collected on
29 channel shifts.

30 Now, do I understand that

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Cross-Exam by Scott

1
2 that is the kind of thing that will be done and presented
3 when you make your application to the department or the
4 community to open a gravel pit in the stream?

5 WITNESS HARLAN: A I would
6 agree with just about everything. I am not sure we would
7 have bed load or sediment transport in all rivers.

8 Q Would it be desirable to
9 have that material?

10 A For some situations, yes.

11 Q I take it, it would be
12 desirable to have it in some rivers where there were
13 larger significant fish populations.

14 WITNESS MCCART: A Could
15 I comment that one of the problems here, of course, is
16 if you are looking at the Firth River, for instance, it
17 has a large and significant population of Arctic char,
18 but those Arctic char at the time of the year that this
19 operation would take place are primarily upstream 30,
20 40, 50, 60, a hundred miles so it is a little difficult.
21 I think we have to worry about the area of the stream
22 in which the operation might take place and not the
23 fact that the fish, in fact, occur in the stream.

24 Q I understand, Dr. McCart,
25 that that is a justification perhaps for permitting the
26 opening of a pit in that river at the particular time
27 with which we are concerned. I am simply concerned that
28 on the site plan for the gravel pit, or in the supporting
29 material there should be documentation, not for your
30 purposes because you will know it, but for the public's

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1
2 purposes so that they can play some part in an assessment
3 and I take it that in a stream where there significant
4 fish populations, even if it is a quite an appropriate
5 stream for gravel, that kind of information should be
6 made available?

7 A Yes, but I agree you
8 have to know whether, in fact, there^{are} fish populations
9 in the area. What I am trying to determine is why we would
10 need suspended--sorry--bed load information if, in fact,
11 there is no fish population in the vicinity.

12 Q Well, you see --

13 A What I am saying is it
14 may not be generally useful to have this information.

15 Q It may not, but I suppose
16 it may also be that some other fish biologist will take
17 a different view of the river or the populations and --

18 A Well, one of the diffi-
19 culties I see is that I don't know anybody that in
20 fact related measurements, of actual measurements of
21 bed load to--anything to do with fish.

22 Q Well --

23 A There are no clear-cut
24 quantitative relationships between the survival of fish
25 and their eggs and bed load measurements that I am
26 aware of.

27 Q All right. I take it
28 that it is the position of the panel that that information
29 should not be provided on the site plan.

30 I am just trying to get ..

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list of the things that you think should be provided.

A I think that it need not
be provided.

Q All right.

A Prior to the operation.

THE COMMISSIONER: It doesn't exist. Is
that the point?

A No, it doesn't exist and
it is not easy to get, from my understanding. Bed load is
very difficult to determine.

THE COMMISSIONER: And you
made that point a couple of days as I recall. That is,
that no one had studied the impact of an increased
silt load or whatever you call it on the survival of
fish.

A No, I don't think I was
saying that. I have forgotten what I said, but I
wasn't saying that because I don't think that is true.
People have studied the effects of sediment on the
survival of fish eggs, for instance. And we have some
knowledge about the levels of sediment that might affect
free-living fish such as juvenile and adult fish.

Q And the point you are
making now?

A The point I am making now
is that we know that an increased sediment load might,
or probably will affect populations of eggs in the gravel
if it settles out on the bottom but I don't think that
maybe the best way to get at this is by measuring the

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1
2 bed load and in any case, I don't--I think that we would
3 be inclined simply to avoid any area where there was
4 a possibility that there might be eggs in the gravel.

5 And that is the way to
6 approach it I think, simply^{don't}/go there if there is a
7 likelihood of there being eggs in the gravel in the
8 vicinity where increased suspended sediment loads might
9 occur, rather than attempting to measure bed loads.

10 Q Mr. Hemstock, are you
11 prepared to accept that proposition that mining should
12 be avoided in flood plains where there are likely to
13 be eggs that will be damaged by the sediment?

14 WITNESS HEMSTOCK: A I think
15 we would agree to that.

16 THE COMMISSIONER: The kind of
17 answer you just gave, Dr. McCart and it no doubt is
18 a sound answer. It raises this dilemma, if it is a
19 dilemma, If so much depends on where you happen to be,
20 what season, what time of year, climatic conditions, the
21 stage construction is at. There is a certain degree of
22 futility in trying to lay down rules and regulations
23 and guidelines that will govern activity during
24 construction. The dilemma is this, that you can't do
25 that and I can see from many of the answers all of you
26 have given that it is difficult to do. Mr. Scott has
27 brought that out in the sense that often when he has
28 sought to force a guideline upon all of you, you have
29 said well, that would depend on this and this and this
30 and this. So you are in this position that Arctic Gas,

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1
2 if it builds this pipeline has to have its own environ-
3 mental inspectors. Mr. Horte said there would be such
4 people employed by Arctic Gas or by, I think he said by
5 Arctic Gas. You would have these inspectors on the
6 spot and you would have to have a lot of them and they
7 would have to be keeping a sharp lookout and they would
8 have to have a fairly healthy measure of prestige and
9 the right granted by Arctic Gas to push the engineers
10 and construction people around, which is something that
11 has not occurred in the past as far as I know.

12 They would have to, as they
13 do in Alaska, have the government inspectors who would
14 presumably act closely with the companies inspectors, but
15 you are putting a premium on day-to-day surveillance
16 and inspection by people who have to be very highly
17 qualified and armed with, as I say, the power to push
18 the engineers and the construction people around and I
19 that is where you have to go.

20 WITNESS McCART: A No, I
21 don't see that I was, in fact, saying that. What I
22 am saying is that there can be a regulation that gravel
23 should not be removed from any section of the stream
24 in which increases in sedimentation are likely to affect
25 the survival of eggs and that, I think, could be a regu-
26 lation .

27 THE COMMISSIONER: All right.
28 Do you have that regulation?

29 A On the basis of your
30 examination of a particular site then you would have to

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1 be in a position to convince the fisheries and marine
2 service that you in fact know what you are talking
3 about. It would be their regulation and they would
4 have to set aside themselves as well that this was true.
5 Now, as far as Section C goes, we have a very good idea
6 of where the major spawning areas are for the fish that
7 are likely to be in that vicinity during the period of
8 gravel removal and the only fall spawning species
9 that we know of that is likely to be in the vicinity
10 of the pipeline anywhere at that time of the year is
11 the Arctic char.
12

13 Now, we, as I say, have
14 a very good idea at this time and I am sure that our
15 knowledge will improve in the future as to where these
16 things are.

17 WITNESS HEMSTOCK: A. Might
18 I make a comment that I think I certainly the difficulty
19 of making regulations which tend to become very specific
20 because of the tremendous variability over all these
21 natural conditions that we are talking about.

22 It seems to me that you
23 have to then go back to guidelines which are very
24 general and say basically the pipeline will be built
25 in such a manner that there will be no disturbance to fish
26 or minimum disturbance to fish.

27 And leave it to the
28 site specific studies and to the experts of Arctic
29 Gas and with the government or whatever regulatory
30 agency there is, to come up with the specific, site speci-
fic guidelines or regulations which will make that possible.

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(MR. HEMSTOCK CONT'D)

I think the difficulty is that everytime a guideline is written that says as this one we had here, "You shall stay three hundred feet away". And the next thing you come into the condition where somebody wants to move two hundred and ninety-five feet away and it may be just as safe in that particular condition. In fact, a hundred feet may be perfectly safe in that condition but it depends on a site specific study by people who know the area and know what the concerns are to determine whether that is in fact safe or not.

THE COMMISSIONER: I wasn't thinking only of what Dr. McCart had said but of issues that have come up over the past six months and--

I understand your answer Dr. McCart, but someone still has to be at that river at the time the char, or just before presumably, they are migrating, and has to have the power to make sure that migration isn't impeded. At any rate this is, I am the only one here at liberty to philosophize as we go along. Some might call it wool gathering but-- Well carry on, sorry to interrupt you.

MR. SCOTT: I would like now to deal with the question of handling the water that may get into this pit and I take it, Miss Minning, that it is correct to say that at least the times of high flow in the adjacent river, there will be water seeping into

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Minning, Williams.
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1
2 the flood plain pit?

3 WITNESS MINNING: Yes.

4 Q And I take it that that
5 water is likely to pick up alot of silt particularly
6 if the operation isn't shut down? Dr. Harlan you look
7 as if you are searching for a microphone?

8 WITNESS HARLAN: No. The water
9 seeping into the pit will not pick up silt in that
10 process. The working in the pit, in the water would
11 create additional silt.

12 MR. SCOTT: And I take it that
13 the operations are not generally going to be shut down
14 merely because there is seepage of water into the pit
15 and so the water will get very silty or dirty or what-
16 ever the expression is?

17 A Yes. That's correct.

18 Q Now, did I understand from
19 what someone said the other day, that it may be decided
20 to pump the water out of these pits while you are
21 working in them?

22 WITNESS MCCART: I think I
23 answered that question. Someone suggested that this
24 was a possibility and I suggested, and I think in my
25 answer I indicated under some very rare and unusual
26 circumstances it might be a possibility, but I don't
27 see it as something you would want to do on a braided
28 stream on ^{the} / North slope.

29 MR. SCOTT: Well let's speak
30 more generally now. Mr. Williams, are you going to use

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Cross-Exam by Scott

1
2 pumps?

3 WITNESS WILLIAMS: It seems
4 to me that it would be a never ending process that the
5 water is going to be coming in almost as fast unless
6 you had a pretty big pump that-- It is going to be
7 very difficult to pump it out. No, that has, that
8 really hasn't been considered as part of the con-
9 struction plan.

10 MR. SCOTT: Well I take it
11 then that you are going to rely on the seepage of the
12 water through the berm to keep that pit workable?

13 A I am sorry, I have missed
14 something.

15 Q Well you have got a pit,
16 let's say, that is ten feet deep on a flood plain, and
17 there is a flood, a summer storm or something and it
18 fills up. How are you going to continue operations
19 in that pit?

20 A No the, no, no, no.

21 Q I am not an apt pupil. Do
22 your best.

23 A Well, the material, we said
24 we would start pushing the material up in August or late
25 summer or something like that, it is taken out in the
26 wintertime. When you have taken out the material that
27 you want, the site is then leveled off before the spring
28 flood.

29 Q No, but your going to have
30 a berm that prevents fish, for example, from entering

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Minning, Williams.
Cross-Exam by Scott

1
2 the pit area and water is going to seep in through that
3 berm.

4 A Right.

5 Q And if there is a lot of
6 water because there is a spring rain or what have, or
7 an autumn rain, heavy rains, more water will seep in.

8 A Right.

9 Q How are you going to get
10 the water out so you can work in the pit?

11 A It is not going to last
12 that long the high water. It is going to come up and
13 go down very quickly. I think this characteristic of
14 those streams. The water is going to go down, You get
15 on with the work and in the winter you haul the gravel
16 out and you level the pit off before spring.

17 Q Well is it going to seep
18 out the other end of the pit?

19 A It's going, the water is
20 going to mix with the material that you push into the
21 pit, except at that time of the year it is going to be
22 frozen.

23 Q No, your talking about, are
24 you not, after the pit has been leveled out? I am
25 talking about when your working in it. In September,
26 when you are digging gravel out of this pit, water may
27 seep in and if there is a storm, a lot of water may get
28 in. Now, how are you going to continue your operations
29 if you've got, let's say, six feet of water?

30 A Yes, certainly, it is going

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1
2 to run back out again and it is going to seep out as the
3 river recedes.

4 Q And it is going to seep out
5 some kind of berm at the other end is it? Or at
6 either end?

A Yes.

7 Q I see. Well, now if it
8 becomes silty from working in it, is that going to
9 prevent its seepage?

10 A It's going, in my opinion,
11 it's going to prevent most of the silt from seeping out
12 with the water.

13 Q But is the presence of the
14 silt from working in the pit going to prevent the water
15 ultimately from seeping out of the pit?

A I don't think so.

17 Q Because I understand that
18 pumps are used extensively by Alyeska and that that is
19 one of the reasons.

20 A I didn't witness that
21 operation.

22 Q Did you see pumps used in
23 Alyeska?

24 A Not in connection with the
25 borrow operations, no.

26 Q Well now, could I ask you
27 Miss Minning to turn to the drawing of the Rapid Creek
28 mining area, which is found in the Arctic Gas responses.
29 It is found there in rather better form, I think, than
30 the example you gave on a single piece of paper.

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1
2 WITNESS MINNING: Yes, the
3 example on the single piece of paper was made for
4 projection on a screen.

5 MR. HOLLINGWORTH: Could you
6 give us a page ^{reference} / Mr. Scott?

7 MR. SCOTT: It's is after
8 page 55 behind tab A, appendix "A". I want to direct
9 your attention to the Terrace pit here, which is shown
10 in the bottom half of the diagram as area two. Do you
11 see that?

12 WITNESS MINNING: Yes.

13 MR. SCOTT: First of all just
14 to make it clear, I take it the arrows indicating that
15 direction, the directions of the river are backwards,
16 The river runs the other way. Not the way it is shown
17 in the diagram.

18 WITNESS MINNING: Are we
19 looking at the one at the bottom of the page? Is this
20 the one your talking about? Could you show me which
21 one your--

22 MR. SCOTT: It's marked area
23 two.

24 A Yes, I think there is
25 probably an error in that.

26 Q The river runs downhill,
27 rather than uphill as is shown in the diagram.

28 A John Fyles must have been
29 looking over these plans.

30 Q Well, we were going to ask

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that the river should be excluded from development as
 one of the wonders of the world, but we thought perhaps
 that it represented an error.

THE COMMISSIONER: I just
 wanted to say that there is still twenty-five minutes
 to go.

MR. HOLLINGWORTH: Are you
 saying the river ought to be running from the top of
 the page to the bottom.

MR. SCOTT: No, it is running
 that way. In the diagram. It should be running the other
 way. Well, now if we look at the diagrams on the other
 side of the page, the middle one, I see that the, that
 area two, the Terrace pit, is going to be developed,
 at least in that diagram considerably below the creek
 level? And indeed below the creek bottom?

WITNESS MINNING: Yes.

MR. SCOTT: And I suggest to
 you that seepage into that pit, or heavy rain may create
 a pit that has five to ten feet of water in it? Isn't
 that so?

WITNESS HARLAN: If it is not
 frozen between.

Q All right if there
 is a heavy rain that autumn, we have got a pit fifteen
 feet deep, I take it that you may get a lake that is
 five, ten or fifteen feet deep. Is there any doubt about
 that?

WITNESS HARLAN: No.

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1

2

WITNESS MINNING: No.

3

MR. SCOTT: Well, one of the

4

questions that sort of troubles me is why would you

5

put top soil in that pit?

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1 Because that's where it shows and I don't understand
2 the rationale for doing that. I mean Mr. Dabbs
3 has left now and you don't have to worry about hurting
4 his sensitivity, but I just don't understand why,
5 when you have a pit of 10 to 15 feet, which you've
6 excavated, which will contain water undoubtedly at
7 one season or another, you're going to put topsoil in
8 it unless it be to get rid of surplus soils that you
9 may have from some other place.

10 THE COMMISSIONER: Mr. Dabbs
11 is seated in the room ready to take his seat on the
12 panel again if anything untoward occurs.

13 WITNESS MINNING: I would like
14 to add I did not draw this plan.

15 (LAUGHTER)
16 It was drawn by somebody who worked for --

17 MR. SCOTT: Well, I'm not
18 asking for names.

19 WITNESS HARLAN: It's probably
20 the person from Old Crow.

21 Q But none of that makes
22 any sense.

23 WITNESS MINNING: Mr. Scott,
24 this is a typical plan. Obviously it was one of the
25 things that could be omitted if it were not
26 acceptable.

27 Q No, but --

28 A This is an example and
29 there is obviously something wrong with this plan
30 and it may not be approved by someone and it may be

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1 that this is a silly thing.

2 Q Well, if this is presented
3 as a diagram of what you propose, it just makes in that
4 respect no sense whatever, does it? Whoever drew it.

5 THE COMMISSIONER: Right, that's
6 the answer. I was going to say that you didn't stand
7 by it, but you adopted the -- .

8 MR. SCOTT: Well now, if we get
9 a lake in here over the years, over the succeeding
10 spring and so on, isn't there a risk of degradation
11 of the permafrost surrounding that area? Dr. Harlan?

12 WITNESS HARLAN: Yes sir,
13 there would be.

14 Q And isn't it possible
15 that in that circumstance it may lead to unstable
16 banks and a tendency therefore for the lake to grow
17 as the permafrost degrades?

18 A It would depend on the
19 material in which it is located.

20 Q Yes, but in certain
21 materials --

22 A In certain materials, yes.

23 Q -- that is^a conceivable
24 scenario.

25 A Yes.

26 Q Well, I take it therefore
27 that bearing in mind certain materials, what you may
28 be creating on this terrace is a lake of some dimensions
29 depending on how much you take out.

30 A You'd hardly be developing

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1 a borrow pit in ice rich material, if you're dealing
2 with gravels then the possibility or the chances of
3 creating a lake of some dimensions is very small.

4 Q Well, let's take one
5 other possibility. If you look at the river that is
6 immediately to the west and if you bear in mind what
7 Arctic Gas's river man told us, that streams tend
8 to erode at the outside of bends, isn't it likely that at
9 that outside bend, the bend is going to work its way
10 into that lake?

11 A Given sufficient time.

12 Q Yes.

13 A You're talking tens of
14 thousands of years.

15 Q Do you really think
16 we're talking tens of thousands of years at that location
17 with that plan? It's about 200 feet.

18 A According to my diagram
19 it's at least 400.

20 Q All right. Is that still
21 tens of thousands of years ?

22 A I would think so in this
23 situation, yes.

24 Q All right. You don't think
25 it could shift ten feet a year?

26 A Not in this material, 'no.

27 Q I take it you envisage it
28 shifting inches a year.

29 A Yes.

30 Q And that's just as well,

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1 isn't it, because if it shifts any faster than that in
2 the foreseeable future, we're going to have a fish trap
3 of some kind. We'll call it Lake McCart.

4 (LAUGHTER)

5 Isn't that what's going to happen if the bend erodes
6 and opens into that pit?

7 A I don't see how, if you
8 had migration of the channel through the pit then it's
9 not a fish trap, it's a hole in the river. It actually
10 would probably be very good for the fish.

11 Q All right.

12 MR. MARSHALL: Good point.

13 MR. SCOTT: Well now, Miss
14 Minning, I understand that we come this far, ^{an} ~~that~~ active
15 flood plain is subject to seasonal flooding and I take
16 it therefore it can be flooded at times to a depth of
17 two to five feet. Dr. Harlan, perhaps you can answer
18 that.

19 WITNESS HARLAN: Would you
20 repeat the question, please?

21 Q Yes. I have finally
22 learned that an active flood plain is subject to
23 seasonal flooding, and I take it it's quite conceivable
24 that it should flood to a depth of two to five feet.

25 A That's very conceivable,
26 yes.

27 Q Well now, if you look at
28 this diagram again and look at the elevations, its
29 apparent, is it not, that the terrace pit is only one
30 to two feet higher than the active flood plain, so the

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1 creek will flood into the pit, it seems to me undoubted
2 at intervals.

3 A According with what's
4 designated here, we're dealing with a fossil flood
5 plain, not an active flood plain.

6 Q Right. But if you look
7 at the profile on the right-hand side, it is fossil only
8 in the sense that it's only marginally higher than
9 the active flood plain. If you look at the cross-
10 section --

11 A The fact that it's
12 fossil flood plain suggests that it's flooded very,
13 very infrequently. If it was flooded annually, for
14 example, it would not be designated as a fossil flood
15 plain.

16 Q No, but when the difference
17 between a fossil flood plain and an active flood plain
18 is only one or two feet, we may assume that it floods
19 at fairly regular intervals.

20 A I'm not sure I would
21 agree with that.

22 Q I know the definition is
23 that it never floods at all, but I take it that if
24 you look at this particular situation, whether you call
25 it a fossil flood plain or not, it's apparent that it's
26 quite likely to flood. It's only a foot or two higher .

27 A I don't think we can draw
28 that conclusion at all. It depends on the flood
29 characteristics of this river and also the channel in
30 this area, and the width of the active flood plain.

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1 Q All right.

2 A And in such a flood

3 plain as this you may only have a two or three-inch
4 depth of water during^a one in 100-year storm, for example,
5 on the active flood plain.

6 Q Well then, you shouldn't
7 have agreed with my observation that the active flood
8 plain would flood to a depth of two to five feet,
9 because if it flooded to a depth of three feet --

10 A But as a general --

11 Q -- it would be on the
12 fossil plain.

13 A You didn't relate it to
14 this example, Mr. Scott. You asked in general.

15 Q I see. Here it's your
16 opinion that it would not ever flood higher than two
17 feet, or ever in reasonably --

18 A It would rarely flood
19 higher than that, yes.

20 Q Beg your pardon?

21 A It would very rarely.

22 Q All right. Well now,
23 as I understand the scheme, you propose two entirely
24 different schemes for mining an active flood plain and
25 mining a terrace, and they're exhibited, for example,
26 on this diagram. What is the difference between the
27 two in practical terms, bearing in mind degradations
28 that one may be only a foot or two higher than the other?

29 WITNESS WILLIAMS: The main
30 difference that comes to mind is thatⁱⁿ the active flood

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1 plain we'd be harvesting thawed gravel and in the
2 fossil flood plain no doubt it will be frozen.

3 Q That's the difference in
4 terms of the material you get out of it. In terms of
5 deciding which mining scheme you utilize, how do you
6 distinguish?

7 A I think that would have a
8 very great influence on the technique that you use of
9 taking it out. One you'd have to use explosives, on
10 the other you won't. For instance, the frozen stuff
11 you may have to provide some means of breaking it up.
12 The unfrozen you shouldn't have to.

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Harlan, Hemstock, McCart
Minning, Williams
Cross-Exam by Scott

1 Q About the time of restora-
2 tion I understand from the transcribed evidence that
3 the pits will be restored after construction and I
4 just want to get your assurances that I understand the
5 evidence to be that after construction in every case
6 means after construction and before the spring runoff,
7 in the case of flood plains. .

8 A Yes sir.

9 Q Now just a couple of
10 tag ends that concern me, in your responses to the
11 Assessment Group, all the active flood plain pits
12 are shown as containing 2.5 million cubic yards of
13 gravel identically. Is that just a figure chosen be-
14 cause you don't have an accurate figure to indicate
15 lots?

16 WITNESS MINNING: Yes.

17 THE COMMISSIONER: To indicate
18 what?

19 MR. SCOTT: To indicate lots,

20 Q So I take it, Miss Minning,
21 to indicate lots you put 2.5 million cubic yards of
22 gravel in the case of every flood plain. It strikes
23 me strange that they should all have the same available
24 gravel supply.

25 A Yes, well those numbers
26 in there were derived before our field program, those
27 numbers on quantities.

28 Q Yes, but what I'm saying
29 is those numbers on quantity have no relation to reality,
30 they are arbitrary pre-selected numbers which we know,

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1 because they all happen to be identical.

2 A That's right.

3 Q There may be six million
4 cubic yards, they may be only 500,000 cubic yards.

5 A That's correct.

6 THE COMMISSIONER: What
7 relationship do those figures bear to the quantities
8 you require?

9 A Those numbers are
10 generally more than the quantities required.

11 Q It's a good thing then.

12 A And also I might add that
13 a lot of the DIAND granular materials numbers do not
14 show as much as these numbers here, but they still show
15 more than what we're going to need.

16 MR. SCOTT: Q Well, what are
17 the criteria that you will utilize to determine how
18 much gravel shall be taken from each flood plain pit,
19 assuming they all contain 2.5 million yards?

20 How are you going to decide the quantity that you can
21 take out of a flood plain? Now you've told us that
22 you're going to take a million cubic yards out of the
23 Malcolm, for example. How have you decided that you
24 can take a million cubic yards out of there? Or any
25 other river? Is it because that's what you need, or
26 is there some other consideration?

27 A Generally we want to
28 take out what we need.

29 Q Right. You recognize that
30 if the river is a small river, you may thereby upset

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Minning, Williams
Cross-Exam by Scott

1 the river regime, and I take it that in those cases
2 you would have to develop some other criteria to
3 determine the maximum amounts you can take out.

4 A Yes.

5 Q I'm sorry?

6 A Yes.

7 Q What criteria are you
8 going to utilize to determine how much you can take
9 out without upsetting the river regime?

10 WITNESS WILLIAMS: Well, I
11 think the depth measurement would govern, Mr. Scott.
12 We've said we're not going to leave ponds if the
13 aerial extent of the available gravel is not large
14 enough to keep the depth within the limits established
15 after restoration, then alternative sites would have
16 to be found.

17 Q And I take it that on
18 your site plan specifications there will be enough
19 detail to enable either the public or the reviewing
20 authority to determine the basis on which you have
21 decided how much you will take out?

22 A Sure, there would be a
23 survey done to more accurately estimate the quantities
24 available. The diagrams here are taken from orthophoto-
25 mosaics and the accuracy is not anywhere near the same
26 as a detailed land survey would give you.

27 Q And we dealt with it in
28 connection with land borrow, but I take it that in
29 the case of river flood plain pits you will continue
30 to monitor the pits for several years after they are

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1 closed.

2 A Unless, as Dr. McCart
3 suggests, that in a year or two you won't be able to
4 notice where you've taken it, I don't know if further
5 monitoring would be required.

6 Q Monitoring won't take
7 much time, but we can be assured that you will go back
8 and see how things have developed after your mining
9 operation.

10 A Mr. Hemstock?

11 Q N.E.S. will be out of
12 the picture by then, Mr. Hemstock.

13 WITNESS HEMSTOCK: Yes, we
14 would be going back to monitor it. I guess the problem
15 I have is just how long that should proceed. It would
16 seem to me that when permission is granted for the
17 removal of gravel from the pit, that there would be
18 conditions on the cleanup and so on, and that we would
19 go back to the appropriate government agency and get
20 a release that we had completed our operations, we had
21 restored it to a condition which was satisfactory to
22 the regulatory agency, and that would be it from our
23 standpoint. Now that might be -- that would depend on
24 that agency. They may require that perhaps a year's
25 grace between the time we finished and the final inspec-
26 tion.

27 Q Well now, the last topic,
28 and it will only take a moment, is related to spoil
29 disposal and I think it relates primarily to Mr. Williams.
30 I take it it's obvious that in a project of this

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1 dimension there is going to be either from cuts or
2 from some other purpose, spoil that will have to be
3 disposed of.

4 WITNESS WILLIAMS: Yes sir.

5 Q And how are you going to
6 dispose of it? Just to be sure we're talking about the
7 same thing, I'm talking about surplus earth that has
8 been dug or cut away from hills and which remains surplus
9 after the pipe is buried. Are we talking about the
10 same thing?

11 A Yes sir.

12 Q Now what is going to be
13 done with that?

14 A That would depend somewhat
15 on the type of material, Mr. Scott. If we're talking
16 about grading down one of these Yukon slope rivers, for
17 instance, that's going to be gravel, the surplus
18 material would mainly be restored to the right-of-way
19 to reshape or shape the bank, similar to the way it
20 was before the disturbance.

21 Q Well, in highway construc-
22 tion spoil is disposed of either by flattening out
23 little gulleys or building up embankments and various
24 ways of that type. I'm not concerned about that. I'm
25 concerned about situations in which you may have a
26 very substantial volume, how do you deal with it then?

27 A Then we put it back on
28 the right-of-way. We put it back in the place it was
29 taken from. If you're talking about cut grading
30 on the right-of-way to facilitate construction, we've

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1 said, of course, in response to a PAAG question that
2 this would be reduced to the bare minimum, but we do
3 agree that some cut grading will be required and I
4 would say the main place of disposing of it is putting
5 it back on the right-of-way.

6 Q Well, let's take the
7 situation of approaching a river, lets say you have a
8 mile in which you decide to excavate, put in your
9 pipe, and put in select backfill. Obviously what
10 you've taken out to make the trench isn't going back
11 in the trench. You're putting select backfill in the
12 trench. Now what are you going to do with the stuff
13 that came out from the trench for that mile length?

14 A Where we have put select
15 backfill in, I think we've said that it's mainly when
16 it's fairly ice rich soil; if it's real high ice content
17 soil we talked about spreading it over the right-of-
18 way. In that case the ice is going to thaw in the
19 following year and there would be a bit of sediment
20 left. If it's a lesser content, lesser ice content
21 material, and you can't put it back on the right-of-
22 way, then it would have to be hauled to a disposal
23 area and borrow pits on land are one possible location
24 for disposal of such material. But I really don't
25 see that much of it being required.

26 Q You see, the thing that
27 worries me is, let's take a mile and maybe that's
28 too much, we'll take half a mile in which you put in
29 select backfill and you've taken out this material.
30 You don't presumably want to put it on the right-of-way

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1 because the whole point of having snow roads and so on
2 is so that when the snow goes, the right-of-way and
3 its vegetation will remain exactly as it was when
4 you went in there, more or less. So you don't want
5 to pile it on the right-of-way or it will cover all
6 that vegetation that you've been preserving with your
7 snow road, and your snow working surface. So you can't
8 pile it on the berm.
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10 A Why not?
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Q Is that what you are going
to do?

A Well it is certainly one
possibility.

Q All right.

A If it is high ice-content
material, I don't see any problem with putting that back
on top of the select backfill.

Q And seeding on top of
that.

A Sometimes sure.

Q Well, if it is high
ice-content material, it is going to be--Mr. Dabbs
better go back to the moisture rating because it is
going to be pretty wet for a while, isn't it?

A Fine, and that is why the
select backfill is being put in there is to ensure
the integrity of the pipe and if you let the high ice-
content soil melt the following year, then you may or
may not put seed in in the wintertime but if you do
and it washes away, then it needs another application.

Q Well, let's take this
half mile and just try and put the whole thing together.
You need select backfill; therefore, you have taken
the other stuff out. When you put the select backfill
in you are telling me that you are going to put this
high ice-content stuff on top of the berm and then we
have been told by Mr. Dabbs that he is going to come
right along behind you and seed over the snow and I

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2 suggest to you that in that circumstance, in the spring
3 they are going to germination of about zero and have
4 a muddy mess on your hands. That you are going to
5 have to truck it away.

6 A No, I don't think so.

7 Q Do you see any problems
8 with this scenario that I have outlined?

9 A In that case, maybe and I
10 hope you are agreeing that this is not going to happen
11 too frequently.

12 Q I don't know. I will
13 hear what you say on it.

14 A We've never suggested
15 that there's going to be hundreds of miles of this
16 situation, but perhaps Mr. Dabbs would consider a fall
17 seeding in this case after the material has melted..

18 Q Well, let's take on the
19 approach to the Great Bear River. There is going to
20 be a lot of it there, isn't there?

21 A A lot of high ice-content
22 material. No, I don't think so.

23 Q There is going to be a lot
24 of spoil?

25 A Right. And it is going
26 to be restored to the right-of-way.

27 Q It is going to be --

28 A There is going to be
29 cutgrade--some cutgrading required there, no doubt. And
30 those cuts are going to be filled up with the material

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1 that you took out.

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3 Q All right, so in general
4 I take it, you feel that you will not have any quantities
5 of spoil that cannot generally speaking be disposed of
6 by putting it on the berm?

7 A In the case of the Great
8 Bear that you just mentioned, not just on the berm, it
9 is on the full width of the right-of-way.

10 Q What is the point of
11 putting, let's say a foot of spoil on the top of a right-
12 of-way when you've gone to considerable trouble and
13 expense to preserve the vegetation on that right-of-way?

14 A Well, then you haven't
15 excavated a cut, Mr. Scott. How the devil can you
16 excavate a cut and preserve the vegetation at the same
17 time?

18 Q You're right. You're
19 right. All right, let's take that situation. Are you
20 confidently telling us that there will be, for all
21 practical purposes along the route, no spoil that cannot
22 be disposed of either by placing it on the berm or
23 where cuts have been made in the cuts?

24 A No, I'm not saying that.
25 There certainly could be some places where you would
26 want to truck it away and dump it in a gravel pit. I
27 think I said that earlier.

28 Q All right. But generally
29 speaking

30 A But generally speaking
I would see it replaced on the right-of-way.

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Q All right. Well now, in those cases where you have to truck it away. Is it going to be dumped in gravel pits?

A That is one possible location or another suitable disposal areas as soon as they are agreed upon between Arctic Gas and the regulatory agencies.

Q Well, what other suitable disposal areas--what types of other disposal areas are you thinking of? I understand about gravel pits.

A Oh, perhaps swampland, lowlying flatland that doesn't drain comes to mind.

Q Has any particular consideration been given to any such locations?

A No, sir. No such detailed work has been done.

MR. SCOTT: Now, just one question for Mr. Marshall, if I may and then I am finished. I wonder, Mr. Marshall, whether we are expected to ask this panel questions on visual aesthetics in general or whether that is for panel three?

MR. MARSHALL: You can ask questions if you like. I believe that Mr. Hemstock is dealing with that subject in his evidence in the panel for phase three.

MR. SCOTT: Well, then I --

WITNESS HEMSTOCK: I thought we had dealt with it in phase two. Perhaps we could try and handle it here in this phase and if there are

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are questions which we could not answer we could provide
that later on.

MR. SCOTT: All right and
I take it that this then is also the panel that we
should ask about landscape architecture to reduce
visual impacts. And is this also, Mr. Marshall, the
panel that we should ask question about landmarks,
recreation areas, I.B.P. reserves, archaeological digs,
and so on.

MR. MARSHALL: Yes.

MR. SCOTT: All right. Thank
you. We may have a little after we have dealt with
water. These are all the questions I have at this
time, Mr. Commissioner.

MR. MARSHALL: Mr. Scott, I was
wondering whether you, or any of the other counsel had
further questions of Miss Minning or have we exhausted
the borrow?

MR. SCOTT: I have no further
questions of Miss Minning.

MR. HOLLINGWORTH: No.

THE COMMISSIONER: Well, you
are excused, Miss Minning. If you decide to return
to the south tonight or tomorrow or whenever.

MR. BAYLY: Mr. Commissioner, I
don't think I have any, but if there are answers that
Dr. McCart or Mr. Williams can't give tomorrow perhaps
the answers can be conveyed to ^{us by} Miss Minning's counsel
if she is the one who answers something to do with

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2 water- related questions that have to do with water and
3 borrow --It may come up again.

4 THE COMMISSIONER: Well, maybe
5 you had better remain.

6 MR. MARSHALL: She would be
7 delighted to stay.

8 MR. SCOTT: As long as we have
9 Mr. Williams here.

10 THE COMMISSIONER: I am sorry,
11 Miss Minning, but we might as well do it that way rather
12 than leave it to Mr. Marshall to convey your answers.
13 That sounds like something that isn't going to work.

14 I am not going to leave
15 any -- Well, that is just asking too much of the whole
16 process. Before we adjourn there is one matter that I
17 would like to mention to Mr. Marshall and Mr. Hollingworth
18 You will recall that back in May, I believe it was, or
19 June, Mr. Anthony raised the whole question of corridors
20 and alternate routes. In the course of the argument
21 about that subject, I asked Mr. Genest whether Arctic
22 Gas was prepared to bring forward evidence regarding
23 the impact of an oil pipeline as the pipeline guidelines
24 require. The pipeline guidelines say that anyone who
25 applies to build a gas pipeline has to file evidence at
26 the same time regarding the impact of an oil pipeline
27 in a limited sense and the combined impact of an oil and
28 gas pipeline along the same route. Now, that's in the
29 pipeline guidelines that something that any applicant
30 for a right-of-way is supposed to do. Mr. Genest said

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1 that Arctic Gas intended to do that and would do it
2 in due course. Foothills at that time was an intervener
3 not an applicant and I don't remember what Mr. Gibbs or
4 Mr. Hollingworth said anything about it, but it seems to
5 me that it is clearly an obligation that rests on
6 the Foothills too.

7 And you will recollect
8 that in the Order of Counsel appointing this Inquiry,
9 I am bound to consider the measures that you proposed
10 to deal with--the matters raised in the pipeline guide-
11 lines.

12 I think I made it clear
13 later on, on a number of occasions, that we have to deal
14 with that aspect of the pipeline guidelines because
15 the guidelines were linked to what is now--well, it was
16 called the transportation corridor. It seemed to resem-
17 ble an energy corridor more than a transportation
18 corridor but in any event
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3 THE COMMISSIONER: you might,
4 Mr. Marshall and Mr. Hollingworth, let me know or at
5 least let Mr. Scott know, when you think you would be
6 in a position to bring forward that evidence. No we
7 don't want, if you look at the guidelines, I don't have
8 them in front of me, but they don't say that your to go
9 through the story of frost heave again, if that has
10 any bearing on an oil pipeline, but it has to be
11 dealt with and you might let me know when pursuant to
12 Mr. Genest's undertaking, you are in a position to bring
13 full evidence Mr. Marshall and Mr. Hollingworth, now
14 that you represent an applicant as opposed to a in-
15 tervener, you might consider the guidelines and let me
16 know when your in a position to bring forward that
17 evidence. And you might confer with Mr. Scott in-
18 formally about it. I am not asking you to tell me next
19 week, but you might confer with him about it when you
20 have had a chance to consider it and just see what the
21 extent of the evidence you propose to bring forward
22 might be.

23 MR. MARSHALL: Yes, sir. We'll
24 discuss this with Mr. Scott.

25 MR. HOLLINGWORTH: Another
26 point that is going through my mind after Mr. Marshall's
27 announcement this morning sir, was that some time ago,
28 you asked us to consider whether the guidelines would
29 invasion an application to go across the delta. I don't
30 know whether that has ever been disposed of and I don't

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in what context you are considering the cross-delta
evidence in Inuvik.

THE COMMISSIONER: Yes, I, well you can certainly look at that, but I would think we are in this position that the guidelines were not intended to be something akin to legislation, so that if it were to turn out that the route across the delta is preferable from an environmental, social and economic point of view, it seems to me, subject to what all of you may say, but it seems to me a reflection that we shouldn't allow our hands to be tied by a strict reading of the guidelines. It seems to me the people who do the guidelines, and we have been reading about them recently in the newspapers, it seems to me they were thinking of the very route that was applied for, not that I am saying there is anything wrong with that. They were contemplating not being applied for and I -- You gentlemen can tell me what you think about it, but I wouldn't be inclined to think we ought to be bound by strict reading of the guidelines and ^{if it} turned out that we were, we might have to go back to the Federal Government and say heres a problem, why don't you amend the guidelines, which no doubt they would do, to enable us to consider the cross-delta line and what would be of gain. We know what we would have lost, probably lost some time. Well ^{that is} subject to what all of you may say and if you want to argue that these guidelines preclude us, even considering the cross-delta line, then--

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MR. HOLLINGWORTH: I would suggest an inquiry to know if the matter had ever, had ever been disposed of. I don't know what position, if any, we would take.

THE COMMISSIONER: Well we will adjourn until 9:00 in the morning and we'll sit until 12:00 oclock tomorrow and get along as far as we can, if that's all right?

(PROCEEDINGS ADJOURNED UNTIL NOVEMBER 8, 1975.)

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